

SPXFLOW

> Bolting Systems™

CIS LTD.
HYDRAULIC SOLUTIONS



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About > Bolting Systems™

Best in Class
Hydraulic Pumps,
Torque Wrenches,
Tensioners,
Nut Splitters,
Flange Spreaders,
Other Tools and Software.

TOOLS

- Torque Wrenches
- Torque Wrench Accessories
- Bolt Tensioners
- Wind Tensioners
- Nut Splitters
- Flange Spreaders
- Flange Pullers
- Subsea Tensioners
- Subsea Accessories

PUMPS

- Infinite Stage Electric & Air
- Compact 1,500 Bar Electric Tensioner
- Compact O&M Torque Wrench
- Classic Series Electric & Air Hydraulic
- Standard Flow Tensioner Power Packs
- High Flow & Subsea Tensioner Power Packs
- Hand

ACCESSORIES

- Hoses
- Couplers
- Hydraulic Fluids
- Sockets
- Software
- Backup Wrenches

SPX FLOW Bolting Systems is a full service global manufacturer of controlled bolting solutions, including hydraulic torque and tensioning systems, industry specific certified training programs, system rentals and flange management database software. We are your partner in flange management, both in regards to infrastructure construction, operations and maintenance applications, enabling you to complete your project safely, in less time and on budget.

SPX FLOW Bolting Systems was formed when SPX Hydraulic Technologies, a division of SPX Flow US, LLC, acquired Torque Tension Systems LTD (TTS), of Ashington, UK. The new partnership combined the best high pressure (700 bar/10,000 psi) hydraulic power pack manufacturer, Power Team, with a premier torque and tensioning tool manufacturer, resulting in a **“best-in-class”** bolting system.

SPX FLOW Bolting Systems is dedicated to furthering controlled bolting solutions, engineering and manufacturing new technologies and utilizing advancements in material technology. This resulted in the continuous development of innovative products offering weight and size reduction, with increased safety, performance and durability.

SPX FLOW Bolting Systems has Rental, Sales & Service facilities located around the globe, with plans to add further service centers in other key locations to support our valuable customers. Repair & Calibration center locations include Houston, Texas, USA | Baton Rouge, LA, USA | Aberdeen, U.K. | Singapore and Perth, Australia. Additional customer service offices are located in the Netherlands and Shanghai. We also have a large distribution network that can offer local sales and service support in over 150 countries.

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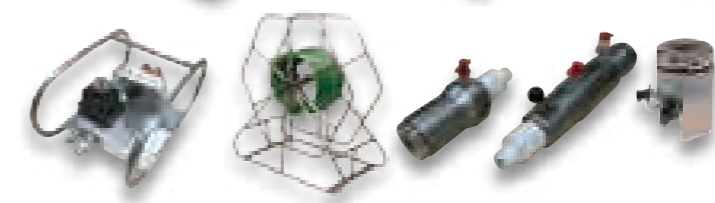
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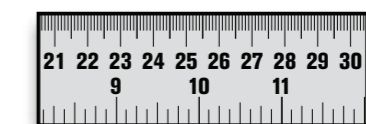
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TORQUE WRENCHES

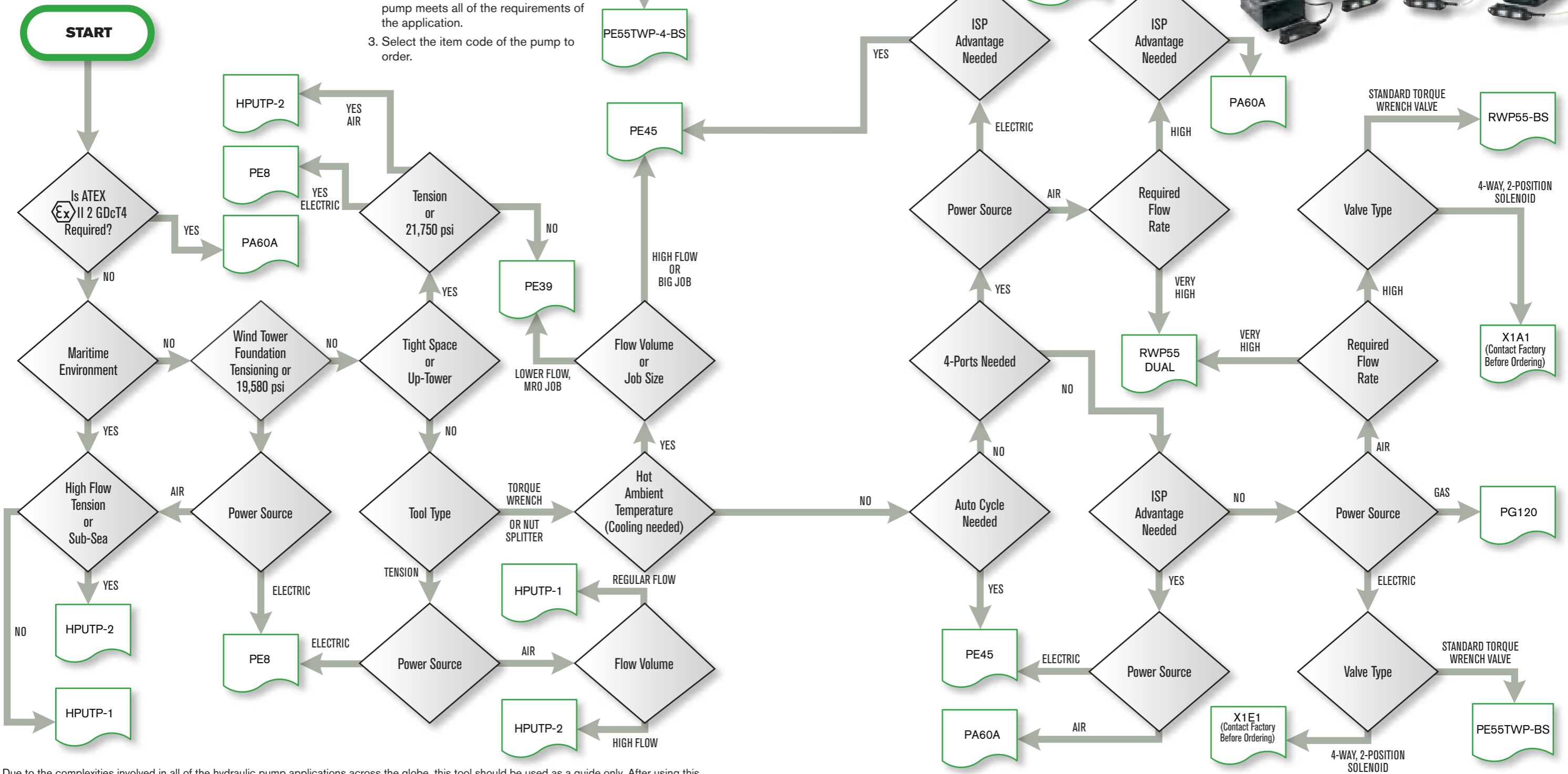
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PUMP SELECT GUIDE

INSTRUCTIONS

This flow chart has been designed to guide you to the family of hydraulic pumps that is most likely to be the final selection for a given application.

1. Follow the flow chart to determine the product family that is most likely best suited for a given application.
2. Review the product information for the product family to ensure the specified pump meets all of the requirements of the application.
3. Select the item code of the pump to order.



Due to the complexities involved in all of the hydraulic pump applications across the globe, this tool should be used as a guide only. After using this guide to find a pump family, a thorough review of the product should be completed to ensure suitability for a specific application and to find the proper item code. Additional product information can be found on sell sheets, in the catalog or on the web: www.spxboltingsystems.com Please contact the factory or an authorized reseller with questions.



TORQUE WRENCHES

MEASUREMENTS/ SPECIFICATIONS

Torque Wrench Selection Guide

HIGH PERFORMANCE, BEST IN CLASS WRENCHES

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Specifications and Dimensional Data

| Bolt Stud Size | | Standard Hex Nut Size | | Heavy Hex Nut Size | | Break Out Tool | | | Make Up Tool | | |
|----------------|-----|-----------------------|-----|--------------------|-----|----------------|--------|------------------------|--------------|--------|------------------------|
| in | mm | in | mm | in | mm | TWHC | TWSD | TWLC | TWHC | TWSD | TWLC |
| 3/4 | 19 | 1-1/8 | 26 | 1-1/4 | 32 | TWHC1 | TWSD1* | TWLC2 | TWHC1 | TWSD1* | TWLC2 |
| 7/8 | 22 | 1-5/16 | 33 | 1-7/16 | 36 | TWHC1 | TWSD1* | TWLC2 | TWHC1 | TWSD1* | TWLC2 |
| 1 | 25 | 1-1/2 | 38 | 1-5/8 | 41 | TWHC1 | TWSD1* | TWLC2 | TWHC1 | TWSD1* | TWLC2 |
| 1-1/8 | 26 | 1-11/16 | 43 | 1-13/16 | 25 | TWHC1 | TWSD1* | TWLC2 | TWHC1 | TWSD1* | TWLC2 |
| 1-1/4 | 32 | 1-7/8 | 48 | 2 | 50 | TWHC3* | TWSD3* | TWLC4 | TWHC1 | TWSD1* | TWLC2 |
| 1-3/8 | 35 | 2-1/16 | 52 | 2-3/16 | 55 | TWHC6 | TWSD6* | TWLC4 | TWHC3 | TWSD3* | TWLC4 |
| 1-1/2 | 38 | 2-1/4 | 57 | 2-3/8 | 60 | TWHC6 | TWSD6* | TWLC4 | TWHC3 | TWSD3* | TWLC4 |
| 1-5/8 | 41 | 2-7/16 | 62 | 2-9/16 | 65 | TWHC6 | TWSD6* | TWLC8 | TWHC6 | TWSD6* | TWLC4 |
| 1-3/4 | 44 | 2-5/8 | 67 | 2-3/4 | 70 | TWHC6 | TWSD6* | TWLC8 | TWHC6 | TWSD6* | TWLC4 |
| 1-7/8 | 48 | 2-13/16 | 71 | 2-15/16 | 75 | - | TWSD11 | TWLC8 | TWHC6 | TWSD6* | TWLC8 |
| 2 | 50 | 3 | 77 | 3-1/8 | 80 | - | TWSD11 | TWLC15 | - | TWSD11 | TWLC8 |
| 2-1/8 | 54 | 3-3/16 | 81 | 3-5/16 | 84 | - | TWSD11 | TWLC15 | - | TWSD11 | TWLC8 |
| 2-1/4 | 57 | 3-3/8 | 85 | 3-1/2 | 89 | - | TWSD11 | TWLC15 | - | TWSD11 | TWLC8 |
| 2-3/8 | 60 | 3-9/16 | 91 | 3-11/16 | 94 | - | TWSD25 | TWLC15 | - | TWSD11 | TWLC15 |
| 2-1/2 | 63 | 3-3/4 | 95 | 3-7/8 | 99 | - | TWSD25 | TWLC30 | - | TWSD11 | TWLC15 |
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| 3-3/4 | 95 | 5-5/8 | - | 5-3/4 | 146 | - | TWSD25 | TWLC30 | - | TWSD25 | TWLC30 |
| 4 | 102 | 6 | 152 | 6 1/8 | 155 | - | TWSD25 | TWLC30 | - | TWSD25 | TWLC30 |
| 4-1/4 | 108 | - | - | 6-1/2 | 159 | TWHC50 | - | - | TWHC50 | - | - |
| 4-1/2 | 114 | - | - | 6 7/8 | 175 | TWHC50 | - | TWLC30 Upon Request | TWHC50 | - | TWLC30 Upon Request |
| 4-3/4 | 120 | - | - | 7-1/4 | 184 | TWHC50 | - | - | TWHC50 | - | - |
| 5 | 127 | - | - | 7-5/8 | 193 | TWHC50 | - | - | TWHC50 | - | - |

Additional torque may be required for loosening in certain situations:

- Rust and corrosion: 2 X break out force
- Heat Corrosion: 3 X break out force

Only the smallest tool suitable for each application, under ideal conditions, is shown.

Tools shown are a guideline only. Chart is not a replacement for calculations. Lubrication, corrosion, material type will all effect actual torque requirement.

*TWSD1, TWSD3 and TWSD6 are obsolete and have been replaced by the TWHC Series.

TORQUE WRENCH OVERVIEW

TWLC

Patented rotating slide design adapts to angle against the piston, keeping forces normal in order to reduce wear and tear.

Unique slide and shuttle piston design automatically engages without the need to manually rotate tool.

Multi way swivel allows easier positioning of the hoses on the job site.

Pin is retained to the link body and will not fall out or get lost on the job site.

Improved hardened steel reaction pad to protect the tool during torquing and modified radius to fit tighter applications.

Steel body link with corrosion resistant nickel plating. Aluminum power head to reduce the overall weight of the tool.

Fully enclosed components without use of a shroud which can bend and cause safety issues.



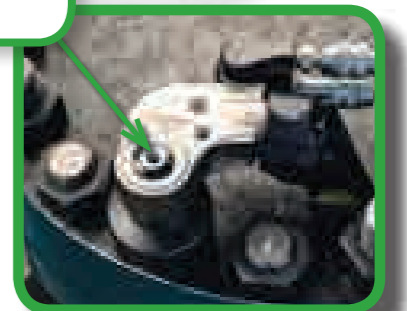
TWHC

Multi-direction swivel allows operator to align the hoses in a convenient position, for any job!

Push button feature allows quick and easy release and re-positioning of the reaction arm without any tools.

Adaptable allen drive inserts for special applications, reference page 22.

With just a push of a button, the quick change square drive requires no tools to change from breakout to makeup.



TORQUE WRENCH HIGH CYCLE - TWHC

Max Torque 71,816 Nm at 700 bar
(53,000 lb-ft at 10,000 psi)



NEW TECHNOLOGY

TWHC CONVERSION CHART,
SEE PAGE 122.



OK FOR SUBSEA



TORQUE WRENCH - HIGH CYCLE

Quality means Lower Cost of Ownership:

- Designed for high cycle life: 2-3x more than existing technology
- Increased reliability: Simple drive assembly means less downtime
- Corrosion resistant material for use in harsh environments

Enhanced Usability:

- Compact nose radius allows the tool to fit in tighter, hard-to-reach spaces
- Low weight, high strength design
- Fast operation, long stroke and optimum flow
- Multi-direction high flow swivel manifold
- Push button square drive reversal and reaction arm positioning
- Push-button release of square drive & reaction arm for all models except TWHC50.

Designed with Safety in Mind:

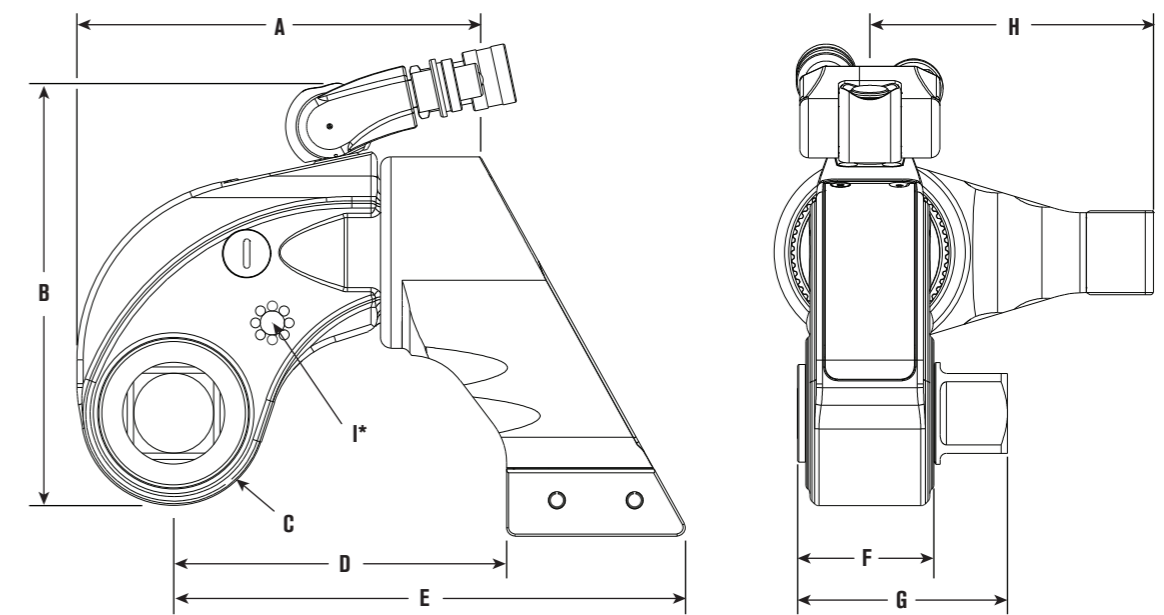
- Fully enclosed drive mechanism for operator safety
- Swivel manifold internal relief valve prevents retract side over-pressurization
- Fine tooth pawl prevents tool 'lock-on'

HANDLES SOLD SEPARATELY

The tool's designed long-stroke mechanism imparts a minimum 30 degree nut rotation per stroke while maintaining a tight and compact nose radius: this is a clear advantage over the short stroke and back-up pawl mechanisms of light alloy competitive models. Fewer parts and reduced torsion in operation - equals reduced wear, maintenance and associated costs.

Specifications and Dimensional Data

TWHC



* Dimension I shows thread size (on both sides of the tool) for safety handle or lifting point. TWHC50 model available with lifting points only.

| Tool Model | Min Torque | | Max Torque | | Square Drive in | A mm (in) | B mm (in) | C mm (in) | D mm (in) | E mm (in) | F mm (in) | G mm (in) | H mm (in) | I | Weight | |
|------------|------------|-------|------------|--------|--------------------|------------------|------------------|-----------------|------------------|------------------|-----------------|-----------------|-----------------|------------|--------|------|
| | lb-ft | Nm | lb-ft | Nm | | | | | | | | | | | Kg | lb |
| TWHC1 | 170 | 230 | 1,413 | 1,915 | 3/4 | 132 (5.20) | 145 (5.71) | 28 (1.10) | 111.5 (4.39) | 170.0 (6.69) | 39.5 (1.56) | 67.7 (2.67) | 86.1 (3.39) | M6 x 1.0 | 2.8 | 6.2 |
| TWHC3 | 376 | 510 | 3,136 | 4,249 | 1 | 165 (6.50) | 173.5 (6.83) | 36.5 (1.44) | 129.6 (5.10) | 197.7 (7.78) | 53 (2.09) | 83.7 (3.30) | 105.1 (4.14) | M6 x 1.0 | 5.3 | 11.7 |
| TWHC6 | 726 | 984 | 6,050 | 8,198 | 1-1/2 | 192 (7.56) | 201.6 (7.94) | 44 (1.73) | 158.5 (6.24) | 243.7 (9.59) | 61 (2.40) | 99.9 (3.93) | 135.1 (5.32) | M8 x 1.25 | 8.8 | 19.4 |
| TWHC50 | 6,360 | 8,628 | 53,000 | 71,816 | 2-1/2 | 404.5 (15.93) | 356.6 (14.04) | 88 (3.46) | 266.5 (10.49) | 446.6 (17.58) | 115 (4.53) | 192.2 (7.57) | 258 (10.16) | M12 x 1.75 | 69 | 152 |

Ordering Information

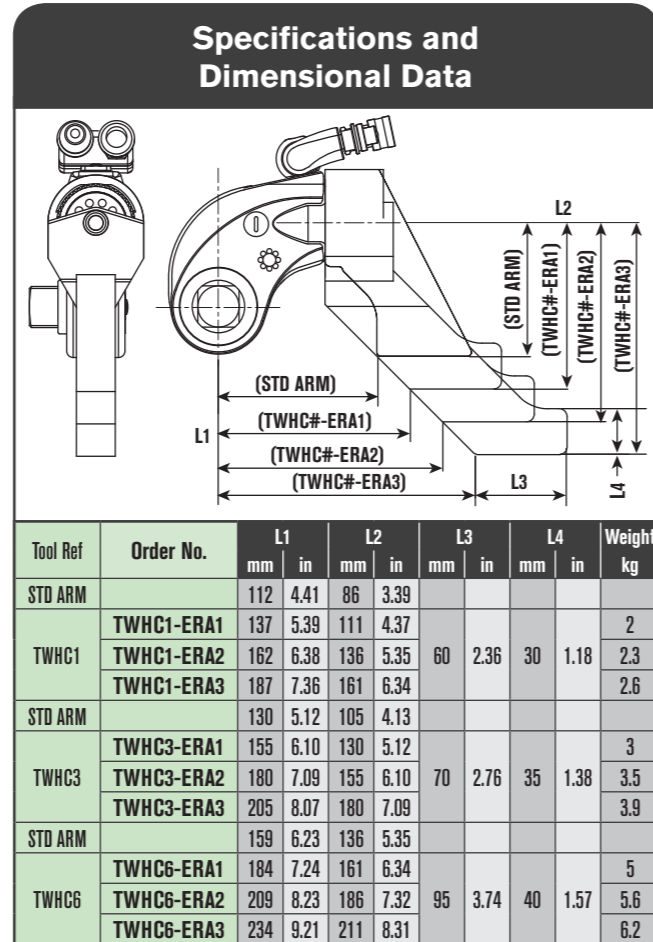
| Order No. | Description | Order No. | Description | Order No. | Description |
|-----------|-------------|-----------|--------------------|-------------|------------------|
| TWHC1 | Wrench | TWHC1H | Wrench with handle | DFTAS000001 | Handle for TWHC1 |
| TWHC3 | Wrench | TWHC3H | Wrench with handle | DFTAS000001 | Handle for TWHC3 |
| TWHC6 | Wrench | TWHC6H | Wrench with handle | DFTAS000002 | Handle for TWHC6 |
| TWHC50 | Wrench | | | | |

TORQUE WRENCH REACTIONS ARMS - TWHC

TWHC EXTENDED REACTION ARM TWHC-ERA



- Long reach version of TWHC standard reaction arm
- 3 standard sizes per model (+25mm/50mm/75mm), specials upon request
- Replaces standard reaction arm – quick release pin locking
- Steel alloy construction
- 360° rotation
- Available for full range of tool sizes

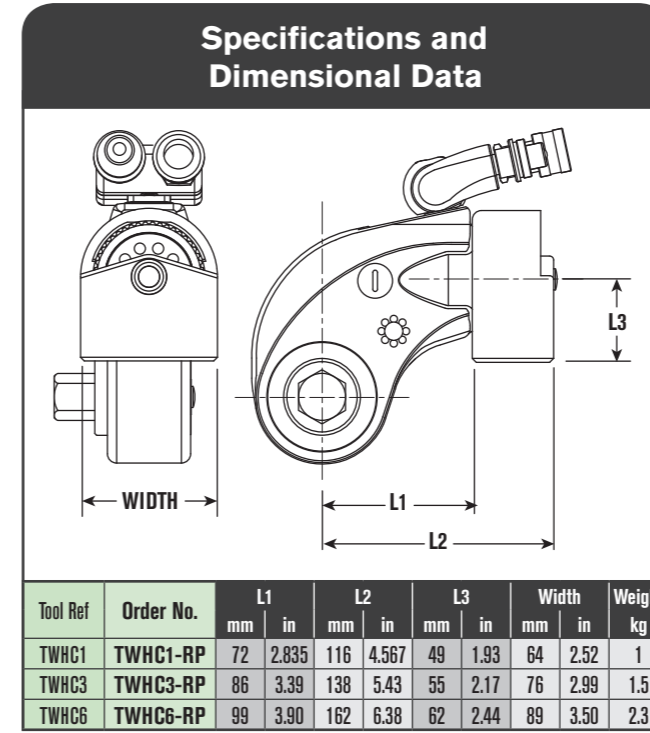


TW HANDLE



- Robust steel construction with ribbed polymer grip
- Multi-position on tool for balanced handling
- Cap-screw locking with positive 'docking'
- Is suitable for all wrench models (TWHC, TWSD, TWLC), however for larger sizes (TWSD25/TWLC 30/TWHC50) we recommend the use of eye-bolt lifting.

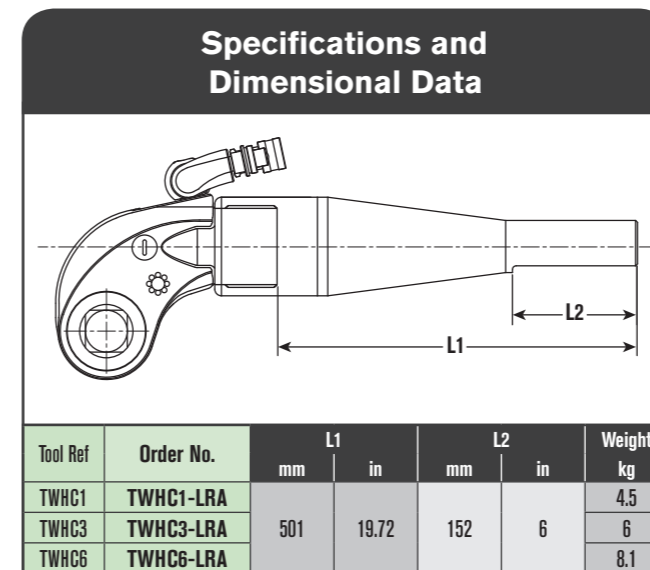
| Order No. | Description | Tool Ref |
|-------------|----------------------|----------|
| DFTAS000001 | Wrench Handle Size 1 | TWSD1 |
| | | TWSD3 |
| | | TWHC1 |
| | | TWHC3 |
| | | TWLC2 |
| DFTAS000002 | Wrench Handle Size 2 | TWSD6 |
| | | TWSD11 |
| | | TWHC6 |
| | | TWLC4 |
| | | TWLC8 |
| | | TWLC15 |



TWHC REACTION PAD TWHC-RP



- Wrench In-Line Reaction Pad for TWHC wrench: used as simple pad or modified platform for specific application (Machine-able/Weld-able platform)
- Replaces standard reaction arm – quick release pin locking
- Steel alloy construction
- 360 degree rotation
- Available for full range of tool sizes



TWHC LONG REACTION ARM TWHC-LRA



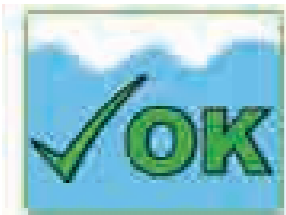
- Tubular extension arm for TWHC wrench: in-line reaction outside wrench profile
- Replaces standard reaction arm – quick release pin locking
- Steel/light alloy construction (reaction flat machined on tube end)
- Can be cut down to suit specific length
- Available for full range of tool sizes

TORQUE WRENCH
SQUARE DRIVE - TWSD
 Max Torque 33,198 Nm at 700 bar
 (24,500 lb-ft at 10,000 psi)



360° Reaction Arm

OK FOR SUBSEA



SQUARE DRIVE TORQUE WRENCH

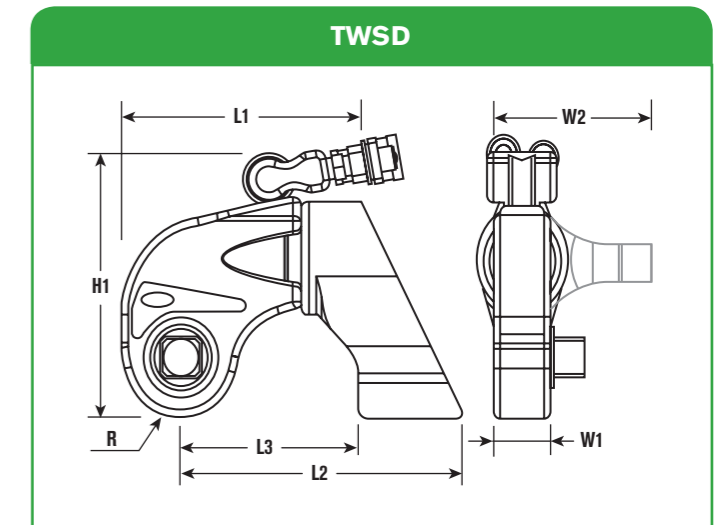
- Low weight, high strength design
- Superior torsional strength
- Fast operation cycle
- Fine tooth ratchet
- Floating piston design
- Swivel manifold internal relief valve prevents retract side over-pressurization
- Rigid steel body construction
- Compact frame size
- Reaction and drive accessories available

TWSD CONVERSION CHART,
 SEE PAGE 120



Specifications and Dimensional Data

- Push button reversal of square drive
- Corrosion resistant finish
- 360° reaction arm
- Push to lock reaction arms
- Multi-axis high flow swivel manifold
- Simple design
- Consistently accurate torque output
- Fully enclosed drive mechanism



| Tool Model | L1 | | L2 | | L3 | | H1 | | R | | W1 | | W2 | |
|------------|-----|-----|------|-----|-----|-----|------|-----|-----|----|-----|----|-----|-----|
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| TWSD11 | 9.2 | 234 | 11.5 | 292 | 7.0 | 178 | 9.5 | 241 | 2.2 | 56 | 2.4 | 61 | 6.5 | 165 |
| TWSD25 | 12 | 305 | 14.8 | 376 | 9.1 | 231 | 12.4 | 315 | 2.8 | 71 | 3.0 | 76 | 7.9 | 200 |

| Tool Model | Square Drive in | Min Torque | | Max. Torque | | Tool Weight | |
|------------|--------------------|------------|-------|-------------|--------|-------------|------|
| | | lb-ft | Nm | lb-ft | Nm | lb | kg |
| TWSD11 | 1-1/2 | 1,313 | 1,780 | 10,940 | 14,823 | 28.9 | 13.1 |
| TWSD25 | 2-1/2 | 2,940 | 3,984 | 24,500 | 33,198 | 65.0 | 29.5 |

TWSD1, TWSD3 and TWSD6 are obsolete and have been replaced by the TWHC Series.

Ordering Information

| Order No. | Description | Order No. | Description |
|---------------|----------------------------------|--------------------|----------------------|
| TWSD11 | WRENCH - 10,940 lb-ft, 14,823 Nm | DFTAS000002 | WRENCH HANDLE Size 2 |
| TWSD25 | WRENCH - 24,500 lb-ft, 33,198 Nm | | Tool Ref. TWSD11 |

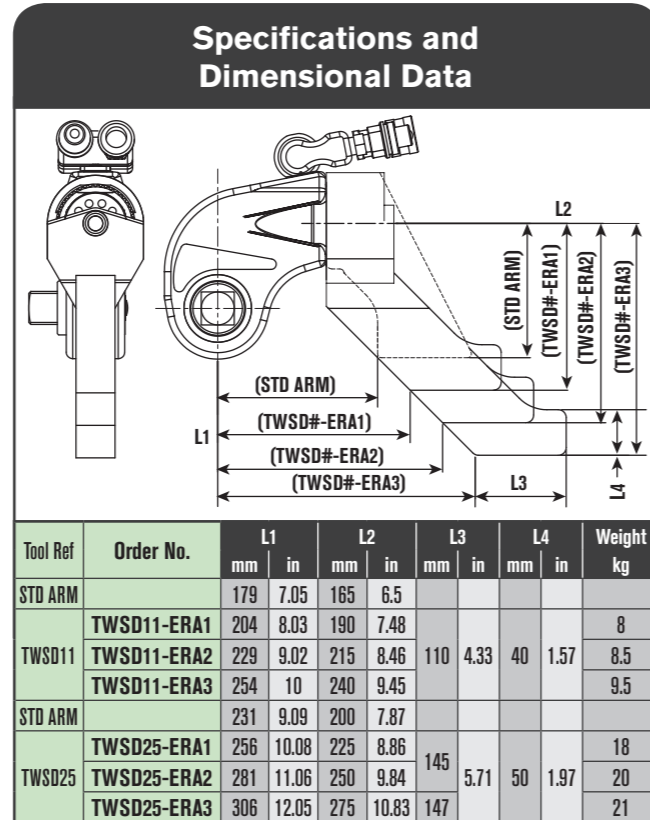
Standard Reaction Arm included for all models

TORQUE WRENCH REACTION ARMS - TWSD

TWSD EXTENDED REACTION ARM TWSD-ERA



- Long reach version of TWSD standard reaction arm
- 3 standard sizes per model (+25mm/50mm/75mm), specials upon request
- Replaces standard reaction arm – quick release pin locking
- Steel alloy construction
- 360° rotation
- Available for full range of tool sizes

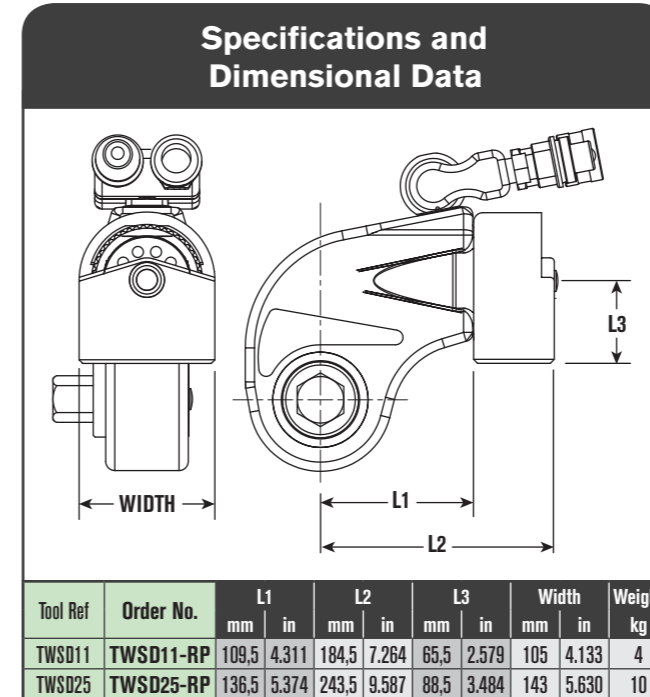


TW HANDLE



- Robust steel construction with ribbed polymer grip
- Multi-position on tool for balanced handling
- Cap-screw locking with positive 'docking'
- Is suitable for all wrench models (TWHC, TWSD, TWLC), however for larger sizes (TWSD25/TWLC30/TWHC50) we recommend the use of eye-bolt lifting.

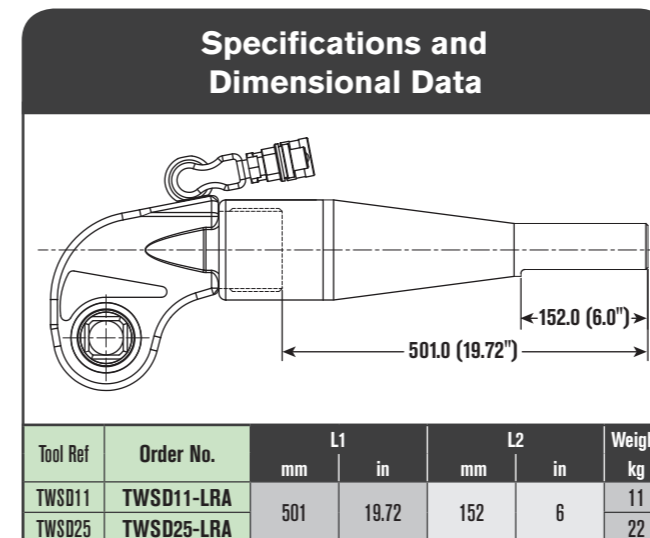
| Order No. | Description | Tool Ref |
|-------------|----------------------|----------|
| DFTAS000001 | Wrench Handle Size 1 | TWHC1 |
| | | TWHC3 |
| | | TWLC2 |
| DFTAS000002 | Wrench Handle Size 2 | TWS011 |
| | | TWHC6 |
| | | TWLC4 |
| | | TWLC8 |
| | | TWLC15 |



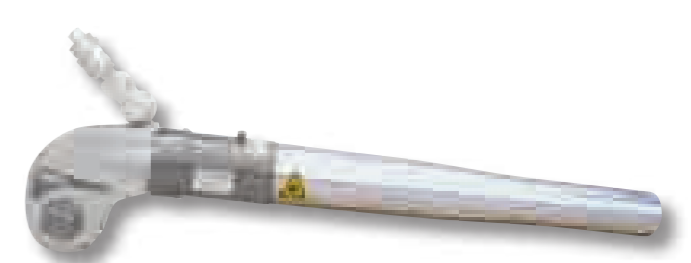
TWSD REACTION PAD TWSD-RP



- Wrench In-Line Reaction Pad for TWSD wrench: used as simple pad or modified platform for specific application (Machine-able/Weld-able platform)
- Replaces standard reaction arm – quick release pin locking
- Steel alloy construction
- 360 degree rotation
- Available for full range of tool sizes

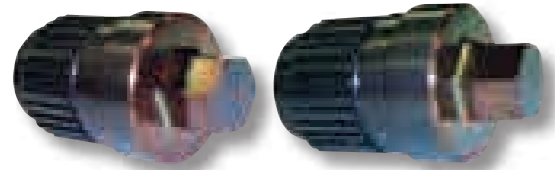


TWSD LONG REACTION ARM TWSD-LRA



- Tubular extension arm for TWSD wrench: in-line reaction outside wrench profile
- Replaces standard reaction arm – quick release pin locking
- Steel/light alloy construction (reaction flat machined on tube end)
- Can be cut down to suit specific length
- Available for full range of tool sizes

SQUARE DRIVE ADAPTERS & SOCKETS



Customs sizes are available upon request

Male Hex Drive

| Wrench Size | Hexagon Drive Size A/F (inch) | Order No. | | Hexagon Drive Size A/F (mm) | Order No. | |
|-------------------------|-------------------------------|-----------|--------------|-----------------------------|-----------|--------------|
| | | TWSD | TWHC | | TWSD | TWHC |
| 1 (TWSD1) (TWHC1) | 5/8 | | TWHCHD01-063 | 17mm | | TWHCHD01-017 |
| | 3/4 | | TWHCHD01-075 | 19mm | | TWHCHD01-019 |
| | 7/8 | | TWHCHD01-088 | 22mm | | TWHCHD01-022 |
| | 1 | | TWHCHD01-100 | 24mm | | TWHCHD01-024 |
| | | | | 27mm | | TWHCHD01-027 |
| 3 (TWSD3) (TWHC3) | 5/8 | | TWHCHD03-063 | 17mm | | TWHCHD03-017 |
| | 3/4 | | TWHCHD03-075 | 19mm | | TWHCHD03-019 |
| | 7/8 | | TWHCHD03-088 | 22mm | | TWHCHD03-022 |
| | 1 | | TWHCHD03-100 | 24mm | | TWHCHD03-024 |
| | 1-1/8 | | TWHCHD03-113 | 27mm | | TWHCHD03-027 |
| | 1/4 | | TWHCHD03-125 | 30mm | | TWHCHD03-030 |
| | 1-3/8 | | TWHCHD03-138 | 32mm | | TWHCHD03-032 |
| | 1-1/2 | | TWHCHD03-150 | 36mm | | TWHCHD03-036 |
| 6 (TWSD6) (TWHC6) | 1-5/8 | | TWHCHD03-163 | 41mm | | TWHCHD03-041 |
| | 5/8 | | TWHCHD06-063 | 17mm | | TWHCHD06-017 |
| | 3/4 | | TWHCHD06-075 | 19mm | | TWHCHD06-019 |
| | 7/8 | | TWHCHD06-088 | 22mm | | TWHCHD06-022 |
| | 1 | | TWHCHD06-100 | 24mm | | TWHCHD06-024 |
| | 1-1/8 | | TWHCHD06-113 | 27mm | | TWHCHD06-027 |
| | 1-1/4 | | TWHCHD06-125 | 30mm | | TWHCHD06-030 |
| 11 (TWSD11) | 1-3/8 | | TWHCHD06-138 | 32mm | | TWHCHD06-032 |
| | 1-1/2 | | TWHCHD06-150 | 36mm | | TWHCHD06-036 |
| | 1-5/8 | | TWHCHD06-163 | 41mm | | TWHCHD06-041 |
| | 1-1/8 | TWD11-113 | | 27mm | TWD11-027 | |
| | 1-1/4 | TWD11-125 | | 30mm | TWD11-030 | |
| | 1-3/8 | TWD11-138 | | 32mm | TWD11-032 | |
| 25 (TWSD25) | 1-1/2 | TWD11-150 | | 36mm | TWD11-036 | |
| | 1-5/8 | TWD11-163 | | 41mm | TWD11-041 | |
| | 1-3/4 | TWD11-175 | | 46mm | TWD11-046 | |
| | 1-1/2 | TWD25-150 | | 36mm | TWD25-036 | |
| | 1-5/8 | TWD25-163 | | 41mm | TWD25-041 | |
| | 1-3/4 | TWD25-175 | | 46mm | TWD25-046 | |
| | 1-7/8 | TWD25-188 | | 50mm | TWD25-050 | |
| | 2 | TWD25-200 | | 55mm | TWD25-055 | |
| 2-1/4 | TWD25-225 | | 60mm | TWD25-060 | | |
| 2-1/2 | TWD25-250 | | 65mm | TWD25-065 | | |
| 2-3/4 | TWD25-275 | | 70mm | TWD25-070 | | |

Impact Sockets - Imperial (for TWHC & TWSD)

| Socket Size Imperial | 3/4" Drive Order No. | 1" Drive Order No. | 1-1/2" Drive Order No. | 2-1/2" Drive Order No. |
|----------------------|----------------------|--------------------|------------------------|------------------------|
| 7/8" | TWSIA088 | TWSIB088 | - | - |
| 1-1/16" | TWSIA106 | TWSIB106 | - | - |
| 1-1/4" | TWSIA125 | TWSIB125 | - | - |
| 1-3/8" | TWSIA138 | TWSIB138 | - | - |
| 1-7/16" | TWSIA144 | TWSIB144 | - | - |
| 1-5/8" | TWSIA163 | TWSIB163 | TWSD163 | - |
| 1-13/16" | TWSIA181 | TWSIB181 | - | - |
| 2" | TWSIA200 | TWSIB200 | TWSD200 | - |
| 2-3/16" | TWSIA219 | TWSIB219 | TWSD219 | - |
| 2-3/8" | TWSIA238 | TWSIB238 | TWSD238 | - |
| 2-9/16" | - | TWSIB256 | TWSD256 | - |
| 2-3/4" | - | TWSIB275 | TWSD275 | - |
| 2-15/16" | - | TWSIB294 | TWSD294 | - |
| 3-1/8" | - | TWSIB313 | TWSD313 | TWSD313 |
| 3-3/8" | - | TWSIB338 | TWSD338 | TWSD338 |
| 3-12" | - | TWSIB350 | TWSD350 | TWSD350 |
| 3-3/4" | - | TWSIB375 | TWSD375 | TWSD375 |
| 3-7/8" | - | TWSIB388 | - | TWSD388 |
| 4-1/8" | - | TWSIB413 | TWSD413 | TWSD413 |
| 4-1/4" | - | TWSIB425 | TWSD425 | TWSD425 |
| 4-5/8" | - | - | TWSD463 | TWSD463 |
| 5" | - | - | - | TWSD500 |
| 5-3/8" | - | - | - | TWSD538 |
| 5-3/4" | - | - | - | TWSD575 |
| 6-1/8" | - | - | - | TWSD613 |

Impact Sockets - Metric (for TWHC & TWSD)

| Socket Size Metric | 3/4" Drive Order No. | 1" Drive Order No. | 1-1/2" Drive Order No. | 2-1/2" Drive Order No. |
|--------------------|----------------------|--------------------|------------------------|------------------------|
| 22mm | TWSMA022 | TWSMB022 | - | - |
| 24mm | TWSMA024 | TWSMB024 | - | - |
| 32mm | TWSMA032 | TWSMB032 | - | - |
| 36mm | TWSMA036 | TWSMB036 | - | - |
| 41mm | TWSMA041 | TWSMB041 | TWSD041 | - |
| 46mm | TWSMA046 | TWSMB046 | - | - |
| 50mm | TWSMA050 | TWSMB050 | - | - |
| 55mm | - | TWSMB055 | - | - |
| 60mm | - | TWSMB060 | TWSD060 | - |
| 65mm | - | TWSMB065 | TWSD065 | - |
| 70mm | - | TWSMB070 | TWSD070 | - |
| 75mm | - | - | TWSD075 | - |
| 80mm | - | TWSMB080 | TWSD080 | TWSD080 |
| 85mm | - | TWSMB085 | TWSD085 | TWSD085 |
| 90mm | - | TWSMB090 | TWSD090 | TWSD090 |
| 95mm | - | TWSMB095 | TWSD095 | TWSD095 |
| 100mm | - | TWSMB100 | - | TWSD100 |
| 110mm | - | TWSMB110 | TWSD110 | TWSD110 |
| 115mm | - | - | TWSD115 | TWSD115 |
| 120mm | - | - | TWSD120 | - |
| 135mm | - | - | - | TWSD135 |
| 150mm | - | - | - | TWSD150 |

For Long Reach (Extended Length) sockets add "LR" to the end of the part number. For 12 point (bi-hex) sockets, add "BH" to the end of the part number.

TORQUE WRENCH

LOW CLEARANCE - TWLC

Max Torque 39,024 Nm at 700 bar
(28,800 lb-ft at 10,000 psi)



Shown with optional handle, refer to page 22 for details.

TORQUE WRENCH LOW CLEARANCE

The TWLC Series Wrench was designed for the most inaccessible bolting areas found in the industry. Its long neck, short height and small radius have all added to its great success.



Several link sizes are available for each drive.

Combine a drive body with a link to make a wrench. Each are sold separately.

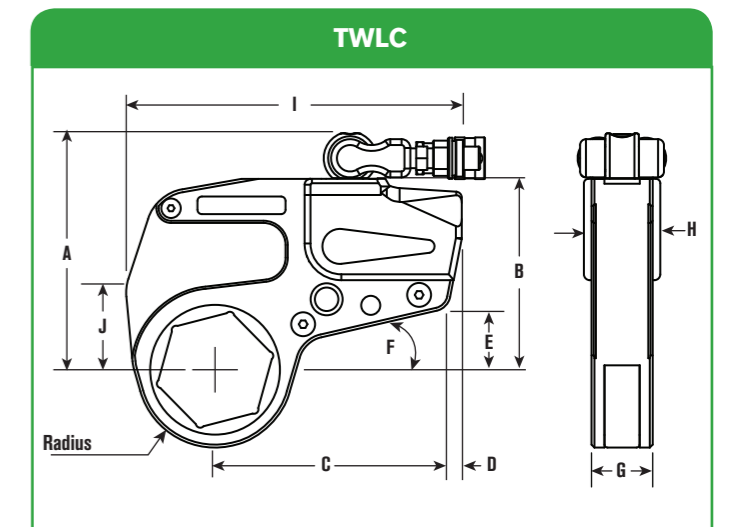
TWSD CONVERSION CHART, SEE PAGE 121

OK FOR SUBSEA



Specifications and Dimensional Data

- Low weight, high strength design
- Superior torsional strength
- Fast operation cycle
- Fine tooth ratchet
- Floating piston design
- Link pin does not fall out
- Auto-connect drive piston
- Compact frame size
- Rigid steel body construction
- Swivel manifold internal relief valve prevents retract side over-pressurization
- “Hardened” steel reaction pad on TWLC8, 15 & 30
- Small nose radius
- Corrosion resistant finish
- Multi-axis high flow swivel manifold
- Simple design
- Consistent torque output



- Quick interchangeable heads, no tools necessary
- Replaceable reaction pad on larger models

| Body Order No. | A | | B | | C | | D | | E | | F | | G | | H | |
|----------------|-----|-----|-----|-----|------|-----|-----|------|-----|----|-----|----|-----|----|-----|----|
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| TWLC2 | 3.8 | 97 | 4.1 | 103 | 5 | 128 | 0.3 | 8 | 1.4 | 35 | 0.5 | 13 | 1.3 | 32 | 1.7 | 42 |
| TWLC4 | 4.7 | 120 | 5.1 | 130 | 6.3 | 159 | 0.4 | 9 | 1.7 | 43 | 0.5 | 13 | 1.7 | 42 | 2 | 52 |
| TWLC8 | 5.8 | 147 | 6.2 | 158 | 7 | 177 | 1 | 24.5 | 1.6 | 40 | 0.6 | 14 | 2.1 | 54 | 2.6 | 67 |
| TWLC15 | 6.9 | 174 | 7.3 | 186 | 7.9 | 200 | 1.1 | 27 | 1.7 | 43 | 0.6 | 14 | 2.5 | 63 | 3 | 76 |
| TWLC30 | 8.8 | 223 | 9.4 | 239 | 10.5 | 267 | 1 | 26 | 2.4 | 62 | 0.6 | 15 | 3.2 | 82 | 3.7 | 94 |

| Body Order No. | Hex Range | | | | Min Torque | | Max Torque | | Weight (Body Only) | |
|----------------|-----------|---------|----|-----|------------|-------|------------|--------|--------------------|------|
| | in | in | mm | mm | lb-ft | Nm | lb-ft | Nm | lb | kg |
| TWLC2 | 1-1/8 | 2-3/8 | 26 | 60 | 189 | 256 | 1,575 | 2,134 | 2.2 | 1.0 |
| TWLC4 | 1-5/16 | 3-1/8 | 33 | 80 | 477 | 646 | 3,975 | 5,386 | 4.4 | 2.0 |
| TWLC8 | 1-7/8 | 3-15/16 | 49 | 100 | 954 | 1,293 | 7,950 | 10,772 | 7.7 | 3.5 |
| TWLC15 | 2-7/16 | 4-5/8 | 62 | 116 | 1,782 | 2,415 | 14,850 | 20,122 | 15.4 | 7.0 |
| TWLC30 | 3-1/8 | 6-1/16 | 80 | 155 | 3,456 | 4,683 | 28,800 | 39,024 | 31.9 | 14.5 |

CAUTION: Always read operating manual before using for proper use of tools and accessories.
NOTE: Reference dimensions shown and vary by links size. Exact dimensions can be found on our website.

Ordering Information

TO SPECIFY A TWLC SOLUTION:

1. Find a link for your application (nut size) (page 25-27)
2. Choose the appropriate Drive body (page 23)
3. Add reducers for additional nut sizes (pages 26-29)

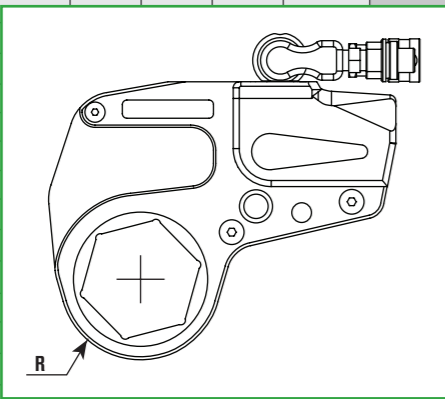
Please order Drive Body and Link separately and pay attention to the same size, for Example TWLC2 and TWL2-041.

TORQUE WRENCH LOW CLEARANCE LINKS - TWLC

Parts Codes, Nose Radius

NOTE:
The sizes listed on these pages encompass both heavy hex and standard hex nut sizes. Check your local SPX FLOW Bolting Office for availability as some items may be special order.

| Nut A/F | | Link Order No. | TWLC2 | | | | TWLC4 | | | | TWLC8 | | | | | | | | |
|---------|--------|----------------|------------------|-----------|-----------|----------------------------|----------------|------------------|-----------|-----------|----------------------------|----------------|------------------|-----------|-----------|----------------------------|--|--|--|
| Inch | Metric | | Radius R mm (in) | I mm (in) | J mm (in) | Weight (Link Only) kg (lb) | Link Order No. | Radius R mm (in) | I mm (in) | J mm (in) | Weight (Link Only) kg (lb) | Link Order No. | Radius R mm (in) | I mm (in) | J mm (in) | Weight (Link Only) kg (lb) | | | |
| 1-1/8 | 26 | TWL2-026 | | | | | | | | | | | | | | | | | |
| 1-1/16 | 27 | TWL2-027 | | | | | | | | | | | | | | | | | |
| 1-1/8 | 29 | TWL2-029 | | | | | | | | | | | | | | | | | |
| 1-3/16 | 30 | TWL2-030 | 31.5 (1.2) | 180 (7.1) | 38 (1.5) | 2 (4.4) | | | | | | | | | | | | | |
| 1-1/4 | 32 | TWL2-032 | | | | | | | | | | | | | | | | | |
| 1-5/16 | 33 | TWL2-033 | | | | | | | | | | | | | | | | | |
| 1-3/8 | 35 | TWL2-035 | | | | | | | | | | | | | | | | | |
| 1-7/16 | 36 | TWL2-036 | | | | | | | | | | | | | | | | | |
| 1-1/2 | 38 | TWL2-150 | | | | | | | | | | | | | | | | | |
| 1-9/16 | 40 | TWL2-040 | 34.5 (1.4) | 181 (7.1) | 40 (1.6) | 2 (4.4) | | | | | | | | | | | | | |
| 1-5/8 | 41 | TWL2-041 | | | | | | | | | | | | | | | | | |
| 1-11/16 | 43 | TWL2-043 | | | | | | | | | | | | | | | | | |
| 1-3/4 | 44 | TWL2-044 | 37 (1.5) | 183 (7.2) | 40 (1.6) | 2 (4.4) | | | | | | | | | | | | | |
| 1-13/16 | 46 | TWL2-046 | | | | | | | | | | | | | | | | | |
| 1-7/8 | 48 | TWL2-188 | | | | | | | | | | | | | | | | | |
| 1-15/16 | 49 | TWL2-049 | 40 (1.6) | 185 (7.3) | 43 (1.7) | 2 (4.4) | | | | | | | | | | | | | |
| 2 | 50 | TWL2-050 | | | | | | | | | | | | | | | | | |
| 2-1/16 | 52 | TWL2-052 | | | | | | | | | | | | | | | | | |
| 2-1/8 | 54 | TWL2-054 | 42.5 (1.7) | 185 (7.3) | 43 (1.7) | 2 (4.4) | | | | | | | | | | | | | |
| 2-3/16 | 55 | TWL2-055 | | | | | | | | | | | | | | | | | |
| 2-1/4 | 57 | TWL2-057 | | | | | | | | | | | | | | | | | |
| 2-5/16 | 59 | TWL2-059 | 45.5 (1.8) | 185 (7.3) | 43 (1.7) | 2 (4.4) | | | | | | | | | | | | | |
| 2-3/8 | 60 | TWL2-060 | | | | | | | | | | | | | | | | | |
| 2-7/16 | 62 | | | | | | | | | | | | | | | | | | |
| 2-1/2 | 63 | | | | | | | | | | | | | | | | | | |
| 2-9/16 | 65 | | | | | | | | | | | | | | | | | | |
| 2-5/8 | 67 | | | | | | | | | | | | | | | | | | |
| 2-11/16 | 68 | | | | | | | | | | | | | | | | | | |
| 2-3/4 | 70 | | | | | | | | | | | | | | | | | | |
| 2-13/16 | 71 | | | | | | | | | | | | | | | | | | |
| 2-7/8 | 73 | | | | | | | | | | | | | | | | | | |
| 2-15/16 | 75 | | | | | | | | | | | | | | | | | | |
| 3 | 77 | | | | | | | | | | | | | | | | | | |
| 3-1/16 | 78 | | | | | | | | | | | | | | | | | | |
| 3-1/8 | 80 | | | | | | | | | | | | | | | | | | |
| 3-3/16 | 81 | | | | | | | | | | | | | | | | | | |
| 3-1/4 | 83 | | | | | | | | | | | | | | | | | | |
| 3-5/16 | 84 | | | | | | | | | | | | | | | | | | |
| 3-3/8 | 85 | | | | | | | | | | | | | | | | | | |
| 3-7/16 | 87 | | | | | | | | | | | | | | | | | | |
| | 89 | | | | | | | | | | | | | | | | | | |
| 3-1/2 | 90 | | | | | | | | | | | | | | | | | | |
| 3-9/16 | 91 | | | | | | | | | | | | | | | | | | |
| 3-5/8 | 92 | | | | | | | | | | | | | | | | | | |
| 3-11/16 | 94 | | | | | | | | | | | | | | | | | | |
| 3-3/4 | 95 | | | | | | | | | | | | | | | | | | |
| 3-13/16 | 97 | | | | | | | | | | | | | | | | | | |
| | 99 | | | | | | | | | | | | | | | | | | |
| 3-7/8 | 100 | | | | | | | | | | | | | | | | | | |



MORE SOLUTIONS ON NEXT PAGE

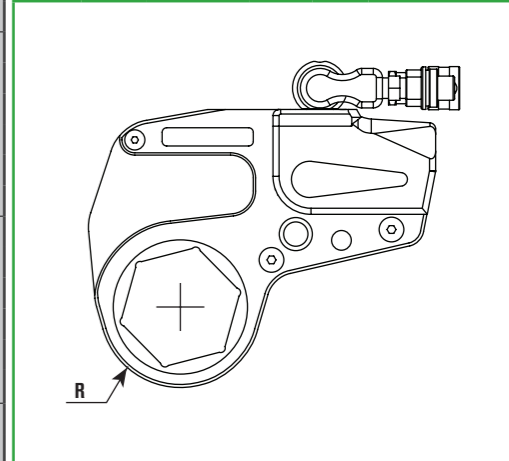
Ordering Information

TO SPECIFY A TWLC SOLUTION:

1. Find a link for your application (nut size) (page 26-27)
2. Choose the appropriate Drive body (page 23)
3. Add reducers for additional nut sizes (pages 28-29)

Please order Drive Body and Link separately and pay attention to the same size, for Example TWLC2 and TWL2-041.

| Nut A/F | | Link Order No. | TWLC15 | | | | TWLC30 | | | | TWLC30 (Continued) | | | | | | | |
|---------|--------|----------------|------------------|------------|-----------|----------------------------|----------------|------------------|-----------|-----------|----------------------------|------|--------|----------------|------------------|-----------|-----------|----------------------------|
| Inch | Metric | | Radius R mm (in) | I mm (in) | J mm (in) | Weight (Link Only) kg (lb) | Link Order No. | Radius R mm (in) | I mm (in) | J mm (in) | Weight (Link Only) kg (lb) | Inch | Metric | Link Order No. | Radius R mm (in) | I mm (in) | J mm (in) | Weight (Link Only) kg (lb) |
| 2-7/16 | 62 | TWL15-062 | | | | | | | | | | | | | | | | |
| 2-1/2 | 63 | TWL15-063 | | | | | | | | | | | | | | | | |
| 2-9/16 | 65 | TWL15-065 | 60.5 (2.4) | 313 (12.3) | 88 (3.5) | 12.5 (27.5) | | | | | | | | | | | | |
| 2-5/8 | 67 | TWL15-067 | | | | | | | | | | | | | | | | |
| 2-11/16 | 68 | TWL15-068 | | | | | | | | | | | | | | | | |
| 2-3/4 | 70 | TWL15-070 | | | | | | | | | | | | | | | | |
| 2-13/16 | 71 | TWL15-071 | 63 (2.5) | 313 (12.3) | 88 (3.5) | 12.5 (27.5) | | | | | | | | | | | | |
| 2-7/8 | 73 | TWL15-073 | | | | | | | | | | | | | | | | |
| 2-15/16 | 75 | TWL15-075 | | | | | | | | | | | | | | | | |
| 3 | 77 | TWL15-077 | 66.5 (2.6) | 313 (12.3) | 88 (3.5) | 13 (28.6) | | | | | | | | | | | | |
| 3-1/16 | 78 | TWL15-313 | | | | | | | | | | | | | | | | |
| 3-1/8 | 80 | TWL15-080 | | | | | | | | | | | | | | | | |
| 3-3/16 | 81 | TWL15-081 | | | | | | | | | | | | | | | | |
| 3-1/4 | 83 | TWL15-083 | | | | | | | | | | | | | | | | |
| 3-5/16 | 84 | TWL15-084 | 72 (2.8) | 313 (12.3) | 8 (0.3) | 13.5 (29.7) | | | | | | | | | | | | |
| 3-3/8 | 85 | TWL15-085 | | | | | | | | | | | | | | | | |
| 3-7/16 | 87 | TWL15-087 | | | | | | | | | | | | | | | | |
| | 89 | TWL15-089 | | | | | | | | | | | | | | | | |
| 3-1/2 | 90 | TWL15-090 | | | | | | | | | | | | | | | | |
| 3-9/16 | 91 | TWL15-091 | 78 (3.1) | 316 (12.4) | 80 (3.1) | 13.5 (29.7) | | | | | | | | | | | | |
| 3-5/8 | 92 | TWL15-092 | | | | | | | | | | | | | | | | |
| 3-11/16 | 94 | TWL15-094 | | | | | | | | | | | | | | | | |
| 3-3/4 | 95 | TWL15-095 | | | | | | | | | | | | | | | | |
| 3-13/16 | 97 | TWL15-097 | | | | | | | | | | | | | | | | |
| | 99 | TWL15-388 | | | | | | | | | | | | | | | | |
| 3-7/8 | 100 | TWL15-100 | | | | | | | | | | | | | | | | |
| 4 | 102 | TWL15-102 | 82.5 (3.2) | 316 (12.4) | 80 (3.1) | 14 (30.8) | | | | | | | | | | | | |
| 4-1/16 | 103 | TWL15-103 | | | | | | | | | | | | | | | | |
| 4-1/8 | 105 | TWL15-105 | | | | | | | | | | | | | | | | |
| 4-3/16 | 106 | TWL15-106 | | | | | | | | | | | | | | | | |
| 4-1/4 | 108 | TWL15-425 | | | | | | | | | | | | | | | | |
| 4-5/16 | 110 | TWL15-110 | | | | | | | | | | | | | | | | |
| 4-3/8 | 111 | TWL15-111 | 87.5 (3.4) | 316 (12.4) | 80 (3.1) | 14 (30.8) | | | | | | | | | | | | |
| 4-7/16 | 113 | TWL15-113 | | | | | | | | | | | | | | | | |
| 4-1/2 | 114 | TWL15-114 | | | | | | | | | | | | | | | | |
| | 115 | TWL15-115 | | | | | | | | | | | | | | | | |
| 4-9/16 | 116 | TWL15-116 | | | | | | | | | | | | | | | | |
| 4-5/8 | 117 | TWL15-463 | | | | | | | | | | | | | | | | |
| 4-11/16 | 119 | | | | | | | | | | | | | | | | | |
| 4-3/4 | 120 | | | | | | | | | | | | | | | | | |



MORE SOLUTIONS ON NEXT PAGE

TORQUE WRENCH

LOW CLEARANCE REDUCERS - TWLC

Drive Body, Links & Reducers

Special sizes available upon request.



Specifications and Dimensional Data

| Body Order No. | Link Order No. | Nut A/F | | Reducer | | Reducer | | Reducer | | Order No. | in | mm | Order No. |
|----------------|----------------|---------|-----|-----------------|--------|-------------|------------------|---------|-------------|-----------------|--------|-------------|-----------|
| | | in | mm | in | mm | in | mm | in | mm | | | | |
| TWLC2 | TWL2-032 | 1-1/4 | 32 | - | - | - | - | - | - | - | - | - | - |
| | TWL2-036 | 1-7/16 | 36 | - | - | - | - | - | - | - | - | - | - |
| | TWL2-041 | 1-5/8 | 41 | 1-5/8 - 1-7/16 | 41-36 | TWR2-041036 | 1-5/8 - 1-1/4 | 41-32 | TWR2-041032 | - | - | - | - |
| | TWL2-046 | 1-13/16 | 46 | 1-13/16 - 1-5/8 | 46-41 | TWR2-046041 | 1-13/16 - 1-7/16 | 46-36 | TWR2-046036 | 1-13/16 - 1-1/4 | 46-32 | TWR2-046032 | - |
| | TWL2-050 | 2 | 50 | 2 - 1-13/16 | 50-46 | TWR2-050046 | 2 - 1-5/8 | 50-41 | TWR2-050041 | 2 - 1-7/16 | 50-36 | TWR2-050036 | - |
| | TWL2-055 | 2-3/16 | 55 | 2-3/16 - 2 | 55-50 | TWR2-055050 | 2-3/16 - 1-13/16 | 55-46 | TWR2-055046 | 2-3/16 - 1-5/8 | 55-41 | TWR2-055041 | - |
| | TWL2-060 | 2-3/8 | 60 | 2-3/8 - 2-3/16 | 60-55 | TWR2-060055 | 2-3/8 - 2 | 60-50 | TWR2-060050 | 2-3/8 - 1-13/16 | 60-46 | TWR2-060046 | - |
| TWLC4 | TWL4-041 | 1-5/8 | 41 | 1-5/8 - 1-7/16 | 41-36 | TWR4-041036 | 1-5/8 - 1-1/4 | 41-32 | TWR4-041032 | - | - | - | - |
| | TWL4-046 | 1-13/16 | 46 | 1-13/16 - 1-5/8 | 46-41 | TWR4-046041 | 1-13/16 - 1-7/16 | 46-36 | TWR4-046036 | 1-13/16 - 1-1/4 | 46-32 | TWR4-046032 | - |
| | TWL4-050 | 2 | 50 | 2 - 1-13/16 | 50-46 | TWR4-050046 | 2 - 1-5/8 | 50-41 | TWR4-050041 | 2 - 1-7/16 | 50-36 | TWR4-050036 | - |
| | TWL4-055 | 2-3/16 | 55 | 2-3/16 - 2 | 55-50 | TWR4-055050 | 2-3/16 - 1-13/16 | 55-46 | TWR4-055046 | 2-3/16 - 1-5/8 | 55-41 | TWR4-055041 | - |
| | TWL4-060 | 2-3/8 | 60 | 2-3/8 - 2-3/16 | 60-55 | TWR4-060055 | 2-3/8 - 2 | 60-50 | TWR4-060050 | 2-3/8 - 1-13/16 | 60-46 | TWR4-060046 | - |
| | TWL4-065 | 2-9/16 | 65 | 2-9/16 - 2-3/8 | 65-60 | TWR4-065060 | 2-9/16 - 2-3/16 | 65-55 | TWR4-065055 | 2-9/16 - 2 | 65-50 | TWR4-065050 | - |
| | TWL4-070 | 2-3/4 | 70 | 2-3/4 - 2-9/16 | 70-65 | TWR4-070065 | 2-3/4 - 2-3/8 | 70-60 | TWR4-070060 | 2-3/4 - 2-3/16 | 70-55 | TWR4-070055 | - |
| | TWL4-075 | 2-15/16 | 75 | 2-15/16 - 2-3/4 | 75-70 | TWR4-075070 | 2-15/16 - 2-9/16 | 75-65 | TWR4-075065 | 2-15/16 - 2-3/8 | 75-60 | TWR4-075060 | - |
| | TWL4-080 | 3-1/8 | 80 | 3-1/8 - 2-15/16 | 80-75 | TWR4-080075 | 3-1/8 - 2-3/4 | 80-70 | TWR4-080070 | 3-1/8 - 2-9/16 | 80-65 | TWR4-080065 | - |
| TWLC8 | TWL8-060 | 2-3/8 | 60 | 2-3/8 - 2-3/16 | 60-55 | TWR8-060055 | 2-3/8 - 2 | 60-50 | TWR8-060050 | 2-3/8 - 1-13/16 | 60-46 | TWR8-060046 | - |
| | TWL8-065 | 2-9/16 | 65 | 2-9/16 - 2-3/8 | 65-60 | TWR8-065060 | 2-9/16 - 2-3/16 | 65-55 | TWR8-065055 | 2-9/16 - 2 | 65-50 | TWR8-065050 | - |
| | TWL8-070 | 2-3/4 | 70 | 2-3/4 - 2-9/16 | 70-65 | TWR8-070065 | 2-3/4 - 2-3/8 | 70-60 | TWR8-070060 | 2-3/4 - 2-3/16 | 70-55 | TWR8-070055 | - |
| | TWL8-075 | 2-15/16 | 75 | 2-15/16 - 2-3/4 | 75-70 | TWR8-075070 | 2-15/16 - 2-9/16 | 75-65 | TWR8-075065 | 2-15/16 - 2-3/8 | 75-60 | TWR8-075060 | - |
| | TWL8-080 | 3-1/8 | 80 | 3-1/8 - 2-15/16 | 80-75 | TWR8-080075 | 3-1/8 - 2-3/4 | 80-70 | TWR8-080070 | 3-1/8 - 2-9/16 | 80-65 | TWR8-080065 | - |
| | TWL8-085 | 3-3/8 | 85 | 3-3/8 - 3-1/8 | 85-80 | TWR8-085080 | 3-3/8 - 2-15/16 | 85-75 | TWR8-085075 | 3-3/8 - 2-3/4 | 85-70 | TWR8-085070 | - |
| | TWL8-090 | 3-1/2 | 90 | 3-1/2 - 3-3/8 | 90-85 | TWR8-090085 | 3-1/2 - 3-1/8 | 90-80 | TWR8-090080 | 3-1/2 - 2-15/16 | 90-75 | TWR8-090075 | - |
| | TWL8-095 | 3-3/4 | 95 | 3-3/4 - 3-1/2 | 95-90 | TWR8-095090 | 3-3/4 - 3-3/8 | 95-85 | TWR8-095085 | 3-3/4 - 3-1/8 | 95-80 | TWR8-095080 | - |
| | TWL8-100 | 3-7/8 | 100 | 3-7/8 - 3-3/4 | 100-95 | TWR8-100095 | 3-7/8 - 3-1/2 | 100-90 | TWR8-100090 | 3-7/8 - 3-3/8 | 100-85 | TWR8-100085 | - |
| | | | | | | | | | | | | | |

12 point links available upon request. Please contact factory.

Ordering Information

TO SPECIFY A TWLC SOLUTION:

1. Find a link for your application (nut size) (page24-27)
2. Choose the appropriate Drive body (page 23)
3. Add reducers for additional nut sizes (pages 26-29)

Please order Drive Body and Link separately and pay attention to the same size, for Example TWLC2 and TWL2-041.

Specifications and Dimensional Data

| Body Order No. | Link Order No. | Nut A/F | | Reducer | | Reducer | | Reducer | | Order No. | in | mm | Order No. |
|----------------|----------------|---------|---------------|-----------------|--------------|---------------|------------------|--------------|---------------|-----------------|--------------|--------------|-----------|
| | | in | mm | in | mm | in | mm | in | mm | | | | |
| TWLC15 | TWL15-070 | 2-3/4 | 70 | 2-3/4 - 2-9/16 | 70-65 | TWR15-070065 | 2-3/4 - 2-3/8 | 70-60 | TWR15-070060 | 2-3/4 - 2-3/16 | 70-55 | TWR15-070055 | - |
| | TWL15-075 | 2-15/16 | 75 | 2-15/16 - 2-3/4 | 75-70 | TWR15-075070 | 2-15/16 - 2-9/16 | 75-65 | TWR15-075065 | 2-15/16 - 2-3/8 | 75-60 | TWR15-075060 | - |
| | TWL15-080 | 3-1/8 | 80 | 3-1/8 - 2-15/16 | 80-75 | TWR15-080075 | 3-1/8 - 2-3/4 | 80-70 | TWR15-080070 | 3-1/8 - 2-9/16 | 80-65 | TWR15-080065 | - |
| | TWL15-085 | 3-3/8 | 85 | 3-3/8 - 3-1/8 | 85-80 | TWR15-085080 | 3-3/8 - 2-15/16 | 85-75 | TWR15-085075 | 3-3/8 - 2-3/4 | 85-70 | TWR15-085070 | - |
| | TWL15-090 | 3-1/2 | 90 | 3-1/2 - 3-3/8 | 90-85 | TWR15-090085 | 3-1/2 - 3-1/8 | 90-80 | TWR15-090080 | 3-1/2 - 2-15/16 | 90-75 | TWR15-090075 | - |
| | TWL15-095 | 3-3/4 | 95 | 3-3/4 - 3-1/2 | 95-90 | TWR15-095090 | 3-3/4 - 3-3/8 | 95-85 | TWR15-095085 | 3-3/4 - 3-1/8 | 95-80 | TWR15-095080 | - |
| | TWL15-100 | 3-7/8 | 100 | 3-7/8 - 3-3/4 | 100-95 | TWR15-100095 | 3-7/8 - 3-1/2 | 100-90 | TWR15-100090 | 3-7/8 - 3-3/8 | 100-85 | TWR15-100085 | - |
| | TWL15-105 | - | 105 | - | 105-100 | TWR15-105100 | - | 105-95 | TWR15-105095 | - | 105-90 | TWR15-105090 | - |
| | TWL15-425 | 4-1/4 | - | 4-1/4 - 3-7/8 | - | TWR15-425388 | 4-1/4 - 3-3/4 | - | TWR15-425375 | 4-1/4 - 3-1/2 | - | TWR15-425350 | - |
| | TWL15-110 | - | 110 | - | 110-105 | TWR15-110105 | - | 110-100 | TWR15-110010 | - | 110-95 | TWR15-110095 | - |
| | TWL15-115 | - | 115 | - | 115-110 | TWR15-115110 | - | 115-105 | TWR15-115105 | - | 115-100 | TWR15-115100 | - |
| TWL15-463 | 4-5/8 | - | 4-5/8 - 4-1/4 | - | TWR15-463425 | 4-5/8 - 3-7/8 | - | TWR15-463388 | 4-5/8 - 3-3/4 | - | TWR15-463375 | - | |
| TWLC30 | TWL30-080 | 3-1/8 | 80 | 3-1/8 - 2-15/16 | 80-75 | TWR30-080075 | 3-1/8 - 2-3/4 | 80-70 | TWR30-080070 | 3-1/8 - 2-9/16 | 80-65 | TWR30-080065 | - |
| | TWL30-085 | 3-3/8 | 85 | 3-3/8 - 3-1/8 | 85-80 | TWR30-085080 | 3-3/8 - 2-15/16 | 85-75 | TWR30-085075 | 3-3/8 - 2-3/4 | 85-70 | TWR30-085070 | - |
| | TWL30-090 | 3-1/2 | 90 | 3-1/2 - 3-3/8 | 90-85 | TWR30-090085 | 3-1/2 - 3-1/8 | 90-80 | TWR30-090080 | 3-1/2 - 2-15/16 | 90-75 | TWR30-090075 | - |
| | TWL30-095 | 3-3/4 | 95 | 3-3/4 - 3-1/2 | 95-90 | TWR30-095090 | 3-3/4 - 3-3/8 | 95-85 | TWR30-095085 | 3-3/4 - 3-1/8 | 95-80 | TWR30-095080 | - |
| | TWL30-100 | 3-7/8 | 100 | 3-7/8 - 3-3/4 | 100-95 | TWR30-100095 | 3-7/8 - 3-1/2 | 100-90 | TWR30-100090 | 3-7/8 - 3-3/8 | 100-85 | TWR30-100085 | - |
| | TWL30-105 | - | 105 | - | 105-100 | TWR30-105100 | - | 105-95 | TWR30-105095 | - | 105-90 | TWR30-105090 | - |
| | TWL30-425 | 4-1/4 | - | 4-1/4 - 3-7/8 | - | TWR30-425388 | 4-1/4 - 3-3/4 | - | TWR30-425375 | 4-1/4 - 3-1/2 | - | TWR30-425350 | - |
| | TWL30-110 | - | 110 | - | 110-105 | TWR30-110105 | - | 110-100 | TWR30-110010 | - | 110-95 | TWR30-110095 | - |
| | TWL30-115 | - | 115 | - | 115-110 | TWR30-115110 | - | 115-105 | TWR30-115015 | - | 115-100 | TWR30-115100 | - |
| | TWL30-463 | 4-5/8 | - | 4-5/8 - 4-1/4 | - | TWR30-463425 | 4-5/8 - 3-7/8 | - | TWR30-463388 | 4-5/8 - 3-3/4 | - | TWR30-463375 | - |
| | TWL30-120 | - | 120 | - | 120-115 | TWR30-120115 | - | 120-110 | TWR30-120110 | - | 120-105 | TWR30-120105 | - |
| | TWL30-500 | 5 | - | 5 - 4-5/8 | - | TWR30-500463 | 5 - 4-1/4 | - | TWR30-500425 | 5 - 3-7/8 | - | TWR30-500388 | - |
| | TWL30-130 | - | 130 | - | 130-120 | TWR30-130120 | - | 130-115 | TWR30-130115 | - | 130-110 | TWR30-130110 | - |
| | TWL30-135 | 5-3/8 | 135 | 5-3/8 - 5 | 135-125 | TWR30-135125 | 5-3/8 - 4-5/8 | 135-120 | TWR30-135120 | 5-3/8 - 4-1/4 | 135-115 | TWR30-135115 | - |
| | TWL30-145 | 5-3/4 | 145 | - | - | - | - | - | - | - | - | - | - |
| TWL30-150 | - | 150 | - | - | - | - | - | - | - | - | - | - | |
| TWL30-155 | 6-1/8 | 155 | - | - | - | - | - | - | - | - | - | - | |

AVAILABLE UPON REQUEST

TORQUE WRENCH REACTION ARMS - TWLC

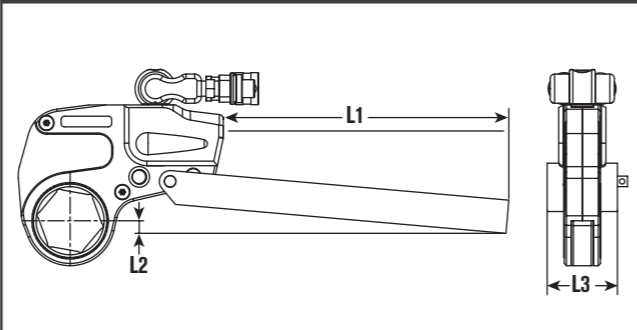
TWLC REACTION BAR TWLC-RB



- In-Line Extension Reaction Bar for TWLC wrench: allows extended reach on the same plane
- Pin engagement, no tools required
- Available for full range of tool sizes

SPX FLOW Bolting Systems offer a varied range of alternative and optional reaction accessories, which help to find a reaction point solution no matter how unusual the bolted application is.

Specifications and Dimensional Data



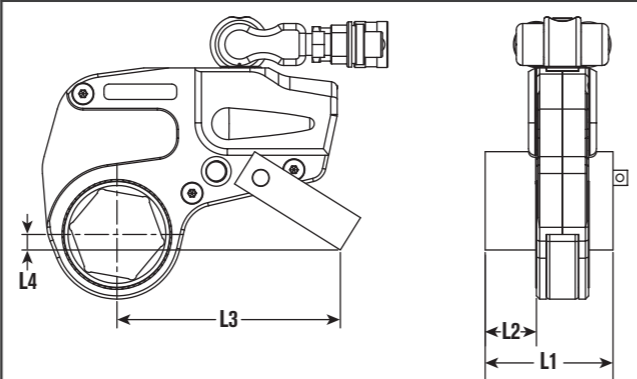
| Tool Ref | Order No. | L1 | | L2 | | L3 | | Weight kg |
|----------|-----------|-----|----|----|------|-----|------|--------------|
| | | mm | in | mm | in | mm | in | |
| TWLC2 | TWLC2-RB | 381 | 15 | 28 | 1.10 | 55 | 2.17 | 2.6 |
| TWLC4 | TWLC4-RB | 457 | 18 | 35 | 1.38 | 66 | 2.60 | 4.8 |
| TWLC8 | TWLC8-RB | 457 | 18 | 37 | 1.46 | 85 | 3.35 | 9 |
| TWLC15 | TWLC15-RB | 508 | 20 | 40 | 1.57 | 102 | 4.01 | 14.5 |
| TWLC30 | TWLC30-RB | 508 | 20 | 35 | 1.38 | 127 | 5 | 27 |

TWLC REACTION PADDLE TWLC-RP



- Off-Set Reaction Arm for TWLC wrench: allows off-set reaction within wrench profile
- Pin engagement, no tools required
- Light alloy construction
- Available for full range of tool

Specifications and Dimensional Data



| Tool Ref | Order No. | L1 | | L2 | | L3 | | L4 | | Weight kg |
|----------|-----------|-------|-------|----|------|-----|-------|----|------|--------------|
| | | mm | in | mm | in | mm | in | mm | in | |
| TWLC2 | TWLC2-RP | 84 | 3.31 | 35 | 1.38 | 142 | 5.59 | 13 | 0.51 | 0.5 |
| TWLC4 | TWLC4-RP | 109 | 4.29 | 46 | 1.81 | 178 | 7.01 | 19 | 0.75 | 0.9 |
| TWLC8 | TWLC8-RP | 136.5 | 5.37 | 57 | 2.25 | 220 | 8.66 | 26 | 1.02 | 1.8 |
| TWLC15 | TWLC15-RP | 165 | 6.50 | 70 | 2.76 | 252 | 9.92 | 45 | 1.77 | 3.5 |
| TWLC30 | TWLC30-RP | 200 | 7.874 | 86 | 3.39 | 317 | 12.48 | 44 | 1.73 | 6 |

HAVE A UNIQUE APPLICATION?
DOES STANDARD PRODUCT NOT FIT?



CUSTOM REACTION PADS AND REDUCERS ARE AVAILABLE.

Contact SPX FLOW or an authorized distributor for more details

**WHEN NOTHING ELSE WILL WORK,
SPLIT ADAPTERS ARE MADE TO
ORDER AND AVAILABLE UPON
REQUEST.**



TWLC15 split adapter,
closed position



TWLC15 split adapter,
open position

TORQUE WRENCH SLIMLINE, TWSL



THE SLIMLINE TORQUE WRENCH

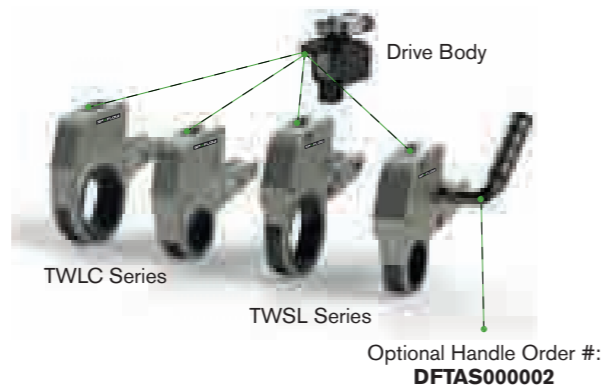
The SlimLine Torque Wrench is engineered to fit inaccessible applications with minimal clearance.

Features & Benefits

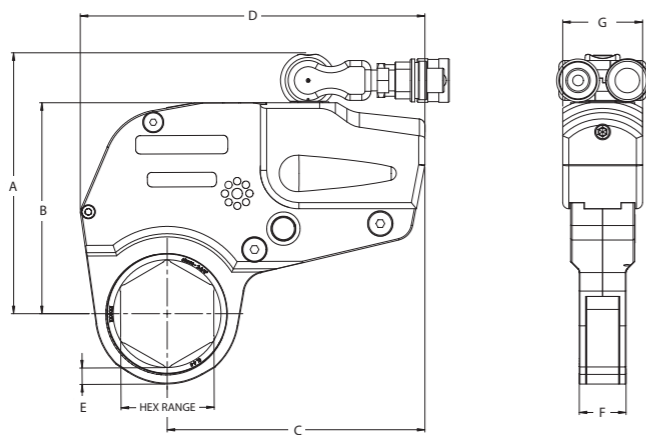
- Dynamic engineering modeling (FEA) optimized tool design to extend life and durability
- The SlimLine links use the same quick change Drive Body as the existing TWLC links
- Small nose radius, fits all standard API and ANSI flanges
- Rigid steel body construction with corrosion resistant plating
- Fully enclosed drive mechanism for operator safety
- Swivel manifold has an internal relief valve to prevent retract side over-pressurization
- Multi-axis swivel technology for free positioning of tool and hoses

DRIVE BODY INTERCHANGES WITH THE TWLC & TWSL LINK SIZES

The Drive Body is designed to interchange with the TWLC (Low Clearance) and the new TWSL (SlimLine) Links, lowering your tool investment across each series to broaden your application reach.



Specifications and Dimensional Data



| Size | A In (mm) | B In (mm) | C In (mm) | D In (mm) | E In (mm) | F In (mm) | G In (mm) |
|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| TWSL4 | 6.61 (168.1) | 5.39 (137.0) | 6.61 (168.0) | 8.83 (224.3) | 0.42 (10.72) | 1.20 (30.5) | 2.04 (52.00) |

SlimLine Application Range

New SlimLine*
(TWSL Series)

Standard
(TWLC Series)

Due to the compact design, the maximum torque of the TWSL links vary depending on link size, * reference the information below for complete details.

The TWSL's narrow width and reduced radius design enables the tool to fit into tight areas where standard low clearance links cannot.

* Shown with optional handle, order # **DFTAS000002**.

Torque Wrench Drive Body Ordering Information for SlimLine

| Drive Body Order No. | Hex Range for SlimLine | | | | SlimLine Min Torque | | SlimLine Max. Torque | | Weight (Body Only) | |
|----------------------|------------------------|---------|----|-----|-----------------------------|-----|-----------------------------|----------------|--------------------|-----|
| | in | in | mm | mm | lb-ft | Nm | lb-ft | Nm | lb | kg |
| TWLC2 | 1-1/8 | 2-3/8 | 28 | 60 | Contact Factory for Details | | Contact Factory for Details | | 2.2 | 1.0 |
| TWLC4 | 1-13/16 | 3-1/8 | 46 | 80 | 505 | 685 | 2,639 ~ 4,210* | 3,578 ~ 5,708* | 4.4 | 2.0 |
| TWLC8 | 2-1/4 | 3-15/16 | 57 | 100 | Contact Factory for Details | | Contact Factory for Details | | 7.7 | 3.5 |

Note: Links are sold separately from the drive body, refer to the tables below.

Torque Wrench Link Ordering Information for SlimLine

| Link Order No. | Hex Range for SlimLine | | | | SlimLine Min Torque | | SlimLine Max. Torque | | Weight (Link Only) | |
|----------------|------------------------|---------|----|-----|-----------------------------|-----|-----------------------------|----------------|-----------------------------|-----------|
| | in | in | mm | mm | lb-ft | Nm | lb-ft | Nm | lb | kg |
| TWSL2-# | 1-1/8 | 2-3/8 | 28 | 60 | Contact Factory for Details | | Contact Factory for Details | | Contact Factory for Details | |
| TWSL4-# | 1-13/16 | 3-1/8 | 46 | 80 | 505 | 685 | 2,639 ~ 4,210* | 3,578 ~ 5,708* | 8.0 - 8.4 | 3.7 - 3.8 |
| TWSL8-# | 2-1/4 | 3-15/16 | 57 | 100 | Contact Factory for Details | | Contact Factory for Details | | Contact Factory for Details | |

Note: The "#" suffix will be replaced with the actual link size in a numeric value.

TWSL4 SlimLine Link Reference Table*

| Nut A/F | Link Order No. | Max. Torque | | Weight (Link Only) | | |
|---------|----------------|-------------|-------|--------------------|-----|------|
| | | lb-ft | Nm | lb | kg | |
| 1-13/16 | 46 | TWSL4-046 | 2,639 | 3,578 | 8 | 3.65 |
| 2 | 50 | TWSL4-050 | 3,271 | 4,435 | 8.2 | 3.72 |
| 2-3/16 | 55 | TWSL4-055 | 3,568 | 4,838 | 8.2 | 3.74 |
| 2-3/8 | 60 | TWSL4-060 | 3,867 | 5,243 | 8.3 | 3.78 |
| 2-9/16 | 65 | TWSL4-065 | 4,210 | 5,708 | 8.4 | 3.79 |
| 2-3/4 | 70 | TWSL4-070 | 4,210 | 5,708 | 8.4 | 3.81 |
| 2-15/16 | 75 | TWSL4-075 | 4,210 | 5,708 | 8.4 | 3.83 |
| 3-1/8 | 80 | TWSL4-080 | 4,210 | 5,708 | 8.4 | 3.82 |

*Contact your nearest Bolting Systems sales representative for assistance in sizing the proper tool for your application, or go to spxboltingsystems.com website for details about other available link sizes not listed.

TENSIONERS

HIGH PERFORMANCE TENSIONERS

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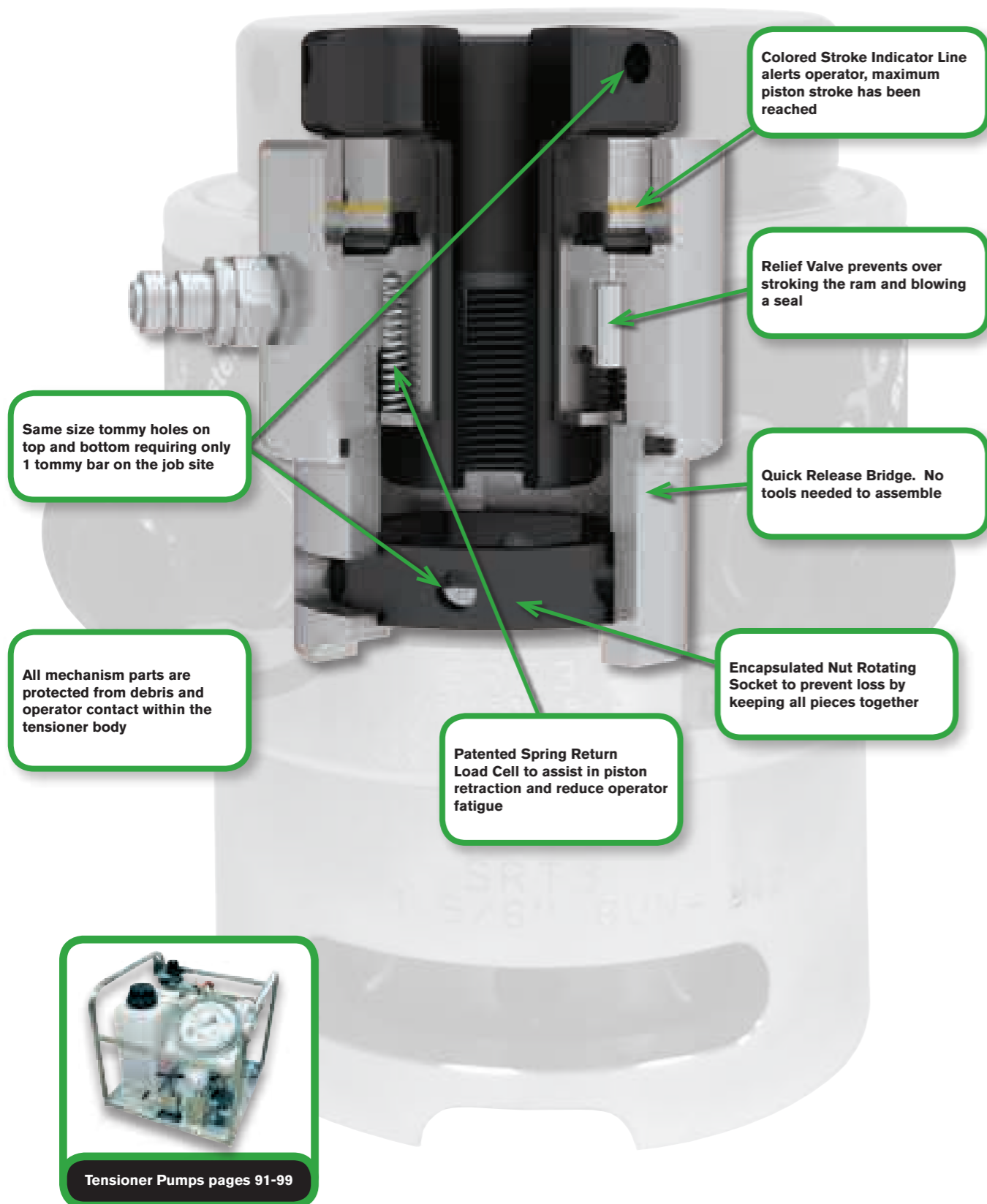


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Subsea Tensioners



Note: Certain tensioners may require minimum order quantity - consult factory for details.

SRT ADVANTAGES



SRT SPRING RETURN BOLT TENSIONER

The Spring Return design dramatically increases productivity and safety on the job site when compared to older technology manual return tensioners.

- Piston overstroke prevention
- Piston stroke indication
- Compatible with MRT Tensioner range
- Unique quick release bridge adaptation
- Piston/cylinder misalignment compensation
- Bolt coverage from 3/4" to 4" (20 - 115 mm) with just 8 tools
- Designed to fit BS1560/ANSI B16.5/API flanges
- Fully enclosed load cell design eliminates entry of debris into piston retraction mechanism
- Piston over-stroke eliminator to prevent over stroking and blowing a seal
- Twin hydraulic couplings for multiple tool connections
- Requires stud to protrude above nut by 1 x bolt diameter
- Application specific tooling available. Contact factory for details.
- 10 mm piston stroke

Max tool pressure: 1,500 bar (21,750 psi)

Bolt protrusion above nut: 1 x bolt diameter (minimum)

BOLT TENSIONER SPRING RETURN - SRT

Bolt coverage from 3/4" to 4"
(20 - 115 mm) with just 8 tools



BOLT TENSIONER SPRING RETURN - SRT

Bolt coverage from 3/4" to 4"
(20 - 115 mm) with just 8 tools

Piston stroke: 10mm

Max tool pressure: 1,500 bar (21,750 psi)

Bolt protrusion above nut: minimum 1 x bolt diameter



Specifications and Dimensional Data

| (Tool Reference) Load Cell Order No. | Stud Diameter | | | | Tool Load | | Hydraulic Area | | Approx. Wt. | | Minimum Bolt Protrusion Above Nut | | | |
|--|---------------|--------------------------|--------|--------------------------|-----------|------|-----------------|-----------------|-------------|------|-----------------------------------|-----|-----------|-----|
| | Imperial | Adaptor Kit Order No. | Metric | Adaptor Kit Order No. | Lbf | kN | in ² | mm ² | lb | kg | Imp bolts | | met bolts | |
| | | | | | | | | | | | in | mm | in | mm |
| (SRT0) SRTAS000001 | 3/4" | SRTAS000002 | M20 | SRTAS000006 | 35,971 | 160 | 1.654 | 1,067 | 3.1 | 1.4 | 0.75 | 19 | 0.79 | 20 |
| | 7/8" | SRTAS000004 | M22 | SRTAS000008 | | | | | | | 0.87 | 22 | 0.87 | 22 |
| (SRT1) SRTAS010001 | 1" | SRTAS010003 | M24 | SRTAS010007 | 62,950 | 280 | 2.894 | 1,867 | 6 | 2.7 | 0.98 | 25 | 0.94 | 24 |
| | - | - | M27 | SRTAS010009 | | | | | | | - | - | 1.06 | 27 |
| | 1-1/8" | SRTAS010005 | - | - | | | | | | | 1.14 | 29 | - | - |
| (SRT2) SRTAS020001 | 1" | SRTAS020003 | M24 | SRTAS020011 | 101,169 | 450 | 4.652 | 3,001 | 9 | 4.1 | 0.98 | 25 | 0.94 | 24 |
| | - | - | M27 | SRTAS020013 | | | | | | | - | - | 1.06 | 27 |
| | 1-1/8" | SRTAS020005 | M30 | SRTAS020014 | | | | | | | 1.14 | 29 | 1.18 | 30 |
| | 1-1/4" | SRTAS020007 | M33 | SRTAS020015 | | | | | | | 1.26 | 32 | 1.30 | 33 |
| | 1-3/8" | SRTAS020009 | M36 | SRTAS020016 | | | | | | | 1.38 | 35 | 1.42 | 36 |
| (SRT3) SRTAS030001 | 1-1/4" | SRTAS030003 | M33 | SRTAS030011 | 148,381 | 660 | 6.822 | 4,401 | 11.9 | 5.4 | 1.26 | 32 | 1.30 | 33 |
| | 1-3/8" | SRTAS030005 | M36 | SRTAS030012 | | | | | | | 1.38 | 35 | 1.42 | 36 |
| | 1-1/2" | SRTAS030007 | M39 | SRTAS030013 | | | | | | | 1.5 | 38 | 1.54 | 39 |
| | 1-5/8" | SRTAS030009 | M42 | SRTAS030014 | | | | | | | 1.61 | 41 | 1.65 | 42 |
| | - | - | - | - | | | | | | | - | - | - | - |
| (SRT4) SRTAS040001 | 1-1/2" | SRTAS040004 | M39 | SRTAS040014 | 224,820 | 1000 | 10.335 | 6,668 | 18.5 | 8.4 | 1.5 | 38 | 1.54 | 39 |
| | 1-5/8" | SRTAS040006 | M42 | SRTAS040015 | | | | | | | 1.61 | 41 | 1.65 | 42 |
| | 1-3/4" | SRTAS040008 | M45 | SRTAS040016 | | | | | | | 1.73 | 44 | 1.77 | 45 |
| | 1-7/8" | SRTAS040010 | M48 | SRTAS040017 | | | | | | | 1.89 | 48 | 1.89 | 48 |
| | 2" | SRTAS040012 | - | - | | | | | | | 2.01 | 51 | - | - |
| | - | - | - | - | | | | | | | - | - | - | - |
| (SRT5) SRTAS050001 | 2" | SRTAS050004 | M52 | SRTAS050012 | 337,230 | 1500 | 15.504 | 10,003 | 30.4 | 13.8 | 2.01 | 51 | 2.05 | 52 |
| | 2-1/4" | SRTAS050006 | M56 | SRTAS050013 | | | | | | | 2.24 | 57 | 2.20 | 56 |
| | - | - | M60 | SRTAS050015 | | | | | | | - | - | 2.36 | 60 |
| | 2-1/2" | SRTAS050008 | M64 | SRTAS050016 | | | | | | | 2.52 | 64 | 2.52 | 64 |
| | - | - | M68 | SRTAS050018 | | | | | | | - | - | 2.68 | 68 |
| | - | - | M70 | SRTAS050020 | | | | | | | - | - | 2.76 | 70 |
| | 2-3/4" | SRTAS050010 | - | - | | | | | | | 2.76 | 70 | - | - |
| | - | - | - | - | | | | | | | 2.76 | 70 | - | - |
| (SRT6) SRTAS060001 | 2-3/4" | SRTAS060004 | M72 | SRTAS060014 | 562,050 | 2500 | 25.84 | 16,671 | 50.7 | 23 | 2.76 | 70 | 2.83 | 72 |
| | 3" | SRTAS060006 | M76 | SRTAS060016 | | | | | | | 2.99 | 76 | 2.99 | 76 |
| | - | - | M80 | SRTAS060018 | | | | | | | - | - | 3.15 | 80 |
| | 3-1/4" | SRTAS060008 | M85 | SRTAS060020 | | | | | | | 3.27 | 83 | 3.35 | 85 |
| | 3-1/2" | SRTAS060010 | M90 | SRTAS060022 | | | | | | | 3.50 | 89 | 3.54 | 90 |
| | - | - | - | - | | | | | | | - | - | - | - |
| (SRT7) SRTAS070001 | 3-1/2" | SRTAS070004 | M90 | SRTAS070010 | 719,424 | 3200 | 33.076 | 21,339 | 70.5 | 32 | 3.50 | 89 | 3.54 | 90 |
| | - | - | M95 | SRTAS070012 | | | | | | | - | - | 3.74 | 95 |
| | 3-3/4" | SRTAS070006 | M100 | SRTAS070014 | | | | | | | 3.74 | 95 | 3.94 | 100 |
| | 4" | SRTAS070008 | - | - | | | | | | | 4.02 | 102 | - | - |
| | - | - | - | - | | | | | | | - | - | - | - |
| (SRT8) SRTAS080001 | 4" | SRTAS080004 | M105 | SRTAS080010 | 921,762 | 4100 | 42.377 | 27,340 | 99.2 | 45 | 4.02 | 102 | 4.13 | 105 |
| | - | - | M110 | SRTAS080012 | | | | | | | - | - | 4.33 | 110 |
| | 4-1/4" | SRTAS080006 | M115 | SRTAS080014 | | | | | | | 4.25 | 108 | 4.53 | 115 |
| | 4-1/2" | SRTAS080008 | - | - | | | | | | | 4.49 | 114 | - | - |

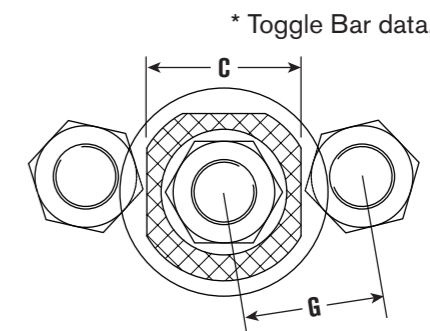
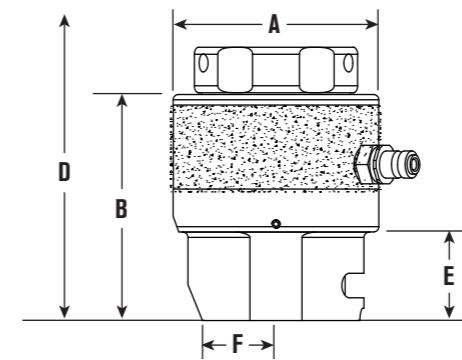
Weight excludes puller sleeve

Need to order load cell and adaptor kit to have complete tensioner

To convert to long tons, divide lbf by 2240. To convert to short tons, divide lbf by 2000.

All bolt diameters ≤ 1" are UNC and all diameters > 1" are 8UN. All metric threads are Metric Coarse.

Specifications and Dimensional Data



* Toggle Bar data, see page 37

'D' includes an allowance for tool removal after bolt tightening with 10 mm tool stroke

| (Tool Reference) Load Cell Order No. | A | | B | | C | | D | | | | E | | F | | G | | | | Stud Diameter | | |
|--|-----|-------|-----|-----|-----|-----|-----------|-----|-----------|-----|-----|-----|-----|----|-----------|-------|-----------|-------|---------------|--------|---|
| | in | mm | in | mm | in | mm | Imp bolts | | met bolts | | in | mm | in | mm | Imp bolts | | met bolts | | Imperial | Metric | |
| | | | | | | | in | mm | in | mm | | | | | in | mm | in | mm | | | |
| (SRT0) SRTAS000001 | 2.6 | 66 | 3.7 | 93 | 2.5 | 63 | 5.4 | 136 | 5.6 | 142 | 1.4 | 36 | 1 | 25 | 2 | 50.8 | 2 | 49.8 | 3/4" | M20 | |
| | | | 3.7 | 93 | 2.5 | 63 | 5.6 | 142 | 5.7 | 144 | 1.4 | 36 | 1 | 25 | 2.1 | 53.6 | 2 | 51 | 7/8" | M22 | |
| (SRT1) SRTAS010001 | 3.4 | 87 | 4.6 | 117 | 2.7 | 68 | 6.9 | 175 | 6.9 | 175 | 1.5 | 38 | 1.1 | 28 | 2.3 | 58.8 | 2.2 | 56.5 | 1" | M24 | |
| | | | 4.6 | 117 | 2.7 | 68 | - | - | 7 | 178 | 1.5 | 38 | 1.1 | 28 | - | - | 2.3 | 58.7 | - | M27 | |
| | | | 4.7 | 120 | 2.8 | 72 | 7.1 | 181 | - | - | 1.6 | 41 | 1.2 | 31 | 2.7 | 68.3 | - | 44.5 | 1-1/8" | - | |
| (SRT2) SRTAS020001 | 4.1 | 103 | 4.6 | 117 | 3 | 75 | 6.9 | 175 | 6.9 | 175 | 1.5 | 38 | 1.2 | 30 | 2.6 | 65.2 | 2.5 | 64.5 | 1" | M24 | |
| | | | 4.6 | 117 | 3 | 75 | - | - | 7 | 178 | 1.5 | 38 | 1.2 | 30 | - | - | 2.6 | 66 | - | M27 | |
| | | | 4.7 | 120 | 3.1 | 80 | 7.1 | 181 | 7.2 | 184 | 1.6 | 41 | 1.2 | 30 | 2.7 | 67.6 | 2.7 | 67.6 | 1-1/8" | M30 | |
| | | | 4.8 | 123 | 3.3 | 84 | 7.4 | 188 | 7.5 | 190 | 1.7 | 44 | 1.4 | 35 | 2.8 | 72.3 | 2.8 | 71.9 | 1-1/4" | M33 | |
| | | | 5 | 126 | 3.5 | 89 | 7.7 | 195 | 7.7 | 196 | 1.9 | 47 | 1.5 | 38 | 3.1 | 78 | 3 | 77 | 1-3/8" | M36 | |
| (SRT3) SRTAS030001 | 4.7 | 118 | 4.8 | 123 | 3.5 | 88 | 7.5 | 190 | 7.6 | 192 | 1.7 | 44 | 1.4 | 35 | 3 | 75.9 | 3 | 76.5 | 1-1/4" | M33 | |
| | | | 5 | 126 | 3.8 | 96 | 7.8 | 197 | 7.8 | 198 | 1.9 | 47 | 1.5 | 38 | 3.2 | 81.1 | 3.2 | 80.8 | 1-3/8" | M36 | |
| | | | 5.1 | 130 | 3.8 | 96 | 8 | 203 | 8 | 204 | 2 | 51 | 1.7 | 42 | 3.3 | 83.8 | 3.3 | 83.6 | 1-1/2" | M39 | |
| | | | 5.2 | 133 | 4.1 | 105 | 8.2 | 209 | 8.3 | 211 | 2.1 | 54 | 1.6 | 41 | 3.6 | 91 | 3.6 | 91 | 1-5/8" | M42 | |
| | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| (SRT4) SRTAS040001 | 5.5 | 140.5 | 5.2 | 132 | 4.4 | 112 | 8.3 | 211 | 8.3 | 212 | 2 | 51 | 1.7 | 42 | 3.6 | 91.8 | 3.6 | 91.6 | 1-1/2" | M39 | |
| | | | 5.3 | 135 | 4.5 | 114 | 8.5 | 217 | 8.6 | 218 | 2.1 | 54 | 1.8 | 45 | 3.8 | 95.6 | 3.8 | 95.5 | 1-5/8" | M42 | |
| | | | 5.5 | 139 | 4.6 | 118 | 8.8 | 223 | 8.9 | 225 | 2.2 | 57 | 2 | 52 | 3.9 | 100 | 3.9 | 100 | 1-3/4" | M45 | |
| | | | 5.6 | 142 | 4.5 | 114 | 9.1 | 230 | 9.1 | 231 | 2.4 | 60 | 2 | 51 | 4 | 101.1 | 4 | 101.3 | 1-7/8" | M48 | |
| | | | 5.7 | 145 | 4.7 | 120 | 9.3 | 236 | - | - | 2.5 | 63 | 2 | 52 | 4.2 | 106.8 | - | - | 2" | - | |
| | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| (SRT5) SRTAS050001 | 6.9 | 175.5 | 5.8 | 148 | 4.7 | 120 | 9.7 | 246 | 9.8 | 248 | 2.5 | 63 | 2 | 52 | 4.5 | 114 | 4.5 | 115 | 2" | M52 | |
| | | | 6.1 | 154 | 5.4 | 138 | 10.2 | 259 | 10.2 | 258 | 2.8 | 70 | 2.3 | 58 | 4.8 | 121.3 | 4.7 | 119.1 | 2-1/4" | M56 | |
| | | | 6.3 | 161 | 5.4 | 138 | - | - | 10.3 | 262 | 2.8 | 70 | 2.3 | 58 | - | - | 4.8 | 122 | - | M60 | |
| | | | 6.3 | 161 | 6 | 153 | 10.7 | 272 | 10.7 | 273 | 3 | 76 | 2.5 | 63 | 5.3 | 134.3 | 5.2 | 132.3 | 2-1/2" | M64 | |
| | | | 6.3 | 161 | 6 | 153 | - | - | 11.1 | 283 | 3 | 76 | 2.5 | 63 | - | - | 5.3 | 135 | - | M68 | |
| | | | 6.3 | 161 | 6 | 153 | - | - | 11.3 | 287 | 3 | 76 | 2.5 | 63 | - | - | 5.3 | 135.2 | - | M70 | |
| | | | 6.6 | 167 | 6.1 | 156 | 11.2 | 284 | 11.1 | 283 | 3.2 | 81 | 2.8 | 70 | 5.6 | 141.3 | - | - | 2-3/4" | - | |
| | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| (SRT6) SRTAS060001 | 8.6 | 219 | 6.6 | 167 | 6.2 | 157 | 11.6 | 294 | 11.7 | 297 | 3.2 | 82 | 2.8 | 72 | 5.7 | 145.4 | 5.8 | 146.5 | 2-3/4" | M72 | |
| | | | 6.9 | 174 | 7.2 | 182 | 12.1 | 307 | 12.1 | 308 | 3.5 | 89 | 3.1 | 80 | 6.3 | 159.8 | 6.1 | 155.5 | 3" | M76 | |
| | | | 6.9 | 174 | 7.2 | 182 | - | - | 12.3 | 312 | 3.5 | 89 | 3.1 | 80 | - | - | 6.2 | 158.4 | - | M80 | |
| | | | 7.1 | 180 | 7.5 | 190 | 12.6 | 320 | 12.7 | 323 | 3.7 | 95 | 3.3 | 84 | 6.7 | 169 | 6.5 | 165 | 3-1/4" | M85 | |
| | | | 7.3 | 186 | 8.1 | 205 | 13.1 | 332 | 13.1 | 334 | 4 | 101 | 3.5 | 88 | 7.2 | 182 | 7 | 178.6 | 3-1/2" | M90 | |
| | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| (SRT7) SRTAS070001 | 9.9 | 252 | 7.3 | 186 | 7.9 | 200 | 13.3 | 339 | 13.4 | 341 | 4 | 101 | 3.5 | 88 | 7.1 | 179.8 | 6.9 | 176.1 | 3-1/2" | M90 | |
| | | | 7.3 | 186 | 7.9 | 200 | - | - | 13.6 | 346 | 4 | 101 | 3.5 | 88 | - | - | | | | | |

BOLT TENSIONER

MANUAL RETURN - MRT

Bolt coverage from 1" to 3-1/2" (24 - 100mm) with just 6 tools



MRT MANUAL RETURN BOLT TENSIONER

Our economy range of bolt tensioners offer low-cost tensioning solutions.

Incorporating our unique quick-release bridge adaptation, a range of adapter kits provide maximum flexibility.

- Piston stroke limit indication
- Piston/cylinder misalignment compensation
- Bolt coverage from 1" to 3-1/2" with just 6 tools
- Designed to fit BS1560/ANSI B16.5/API flanges
- Unique quick-release bridge adaption
- Application specific tooling available. Contact factory for details.

Note: Certain tensioners may require minimum order quantity - consult factory for details.

Specifications and Dimensional Data

Piston stroke: 15mm (excluding MRT1 - 10mm)

Max tool pressure: 1,500 bar (21,750 psi)

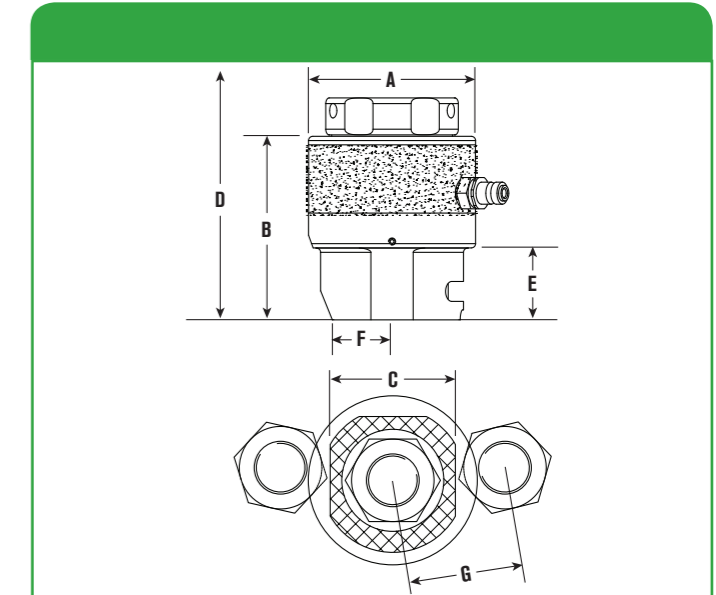
Bolt protrusion above nut: 1 x bolt diameter

'D' includes an allowance for tool removal after bolt tightening with 15mm tool stroke

Weight excludes puller sleeve

To make a complete MRT Tensioner, choose an Adapter Kit and a Load Cell.

Semi-compatible with SRT tensioners. Only compatible with SRT Bridges; NOT puller sleeves. SRT Puller Sleeves cannot be used with MRT Load Cell.



| (Tool Reference) Load Cell Order No. | Stud Diameter | | | | Tool Load | | Hydraulic Area | | Approx. Wt. | | Minimum Bolt Protrusion Above Nut | | | | A in mm | B in mm | C in mm | D | | E | | F | | G | | Stud Diameter | | (Tool Reference) Load Cell Order No. | | | | | | | | | | | |
|--|---------------|--------------------------|--------|--------------------------|-----------|-------|-----------------|-----------------|-------------|-----|-----------------------------------|-----|-----------|-----|---------------|---------------|---------------|-------|-----|-------|------|-------|-------|-------|-------|---------------|-----|--|----------|--------|-----|--------|--------|------|-----------------------|----|---|-----|-------------|
| | Imperial | Adaptor Kit Order No. | Metric | Adaptor Kit Order No. | Lbf | kN | in ² | mm ² | lb | kg | Imp bolts | | met bolts | | | | | in | mm | in | mm | in | mm | in | mm | in | mm | | Imperial | Metric | | | | | | | | | |
| | | | | | | | | | | | in | mm | in | mm | | | | | | | | | | | | | | | | | | | | | | | | | |
| (MRT1) MRTAS010001 | 1" | MRTAS010002 | M24 | MRTAS010004 | 62,900 | 280 | 2.894 | 1,867 | 6.6 | 3 | 0.98 | 25 | 0.94 | 24 | 3.35 | 85 | 3.8 | 97 | 2.7 | 68 | 6.6 | 166.8 | 6.1 | 155.4 | 1.5 | 38 | 1.1 | 28 | 2.3 | 59 | 2.2 | 56 | 1" | M24 | (MRT1) | | | | |
| | - | - | M27 | MRTAS010005 | | | | | | | - | - | 1.06 | 27 | | | | | | | - | - | 6.2 | 158.4 | 1.5 | 38 | 1.1 | 28 | - | - | 2.3 | 59 | - | - | 2.3 | 59 | - | M27 | MRTAS010001 |
| | 1-1/8" | MRTAS010003 | - | - | | | | | | | 1.14 | 29 | - | - | | | | | | | - | - | 1.6 | 41 | 1.2 | 31 | 2.6 | 66 | - | - | 44 | 1-1/8" | - | - | - | - | - | - | - |
| (MRT2) MRTAS020001 | 1" | MRTAS020002 | M24 | MRTAS020006 | 101,100 | 450 | 4.652 | 3,001 | 9.9 | 4.5 | 0.98 | 25 | 0.94 | 24 | 4.25 | 108 | 4 | 102.5 | 3 | 75 | 7.2 | 181.8 | 7.1 | 180.4 | 1.5 | 38 | 1.2 | 30 | 2.7 | 68 | 2.6 | 67 | 1" | M24 | (MRT2) MRTAS020001 | | | | |
| | - | - | M27 | MRTAS020007 | | | | | | | - | - | 1.06 | 27 | | | - | - | 7.2 | 183.4 | 1.5 | 38 | 1.2 | 30 | - | - | 2.7 | 69 | - | - | 2.7 | 69 | - | M27 | | | | | |
| | 1-1/8" | MRTAS020003 | M30 | MRTAS020008 | | | | | | | 1.14 | 29 | 1.18 | 30 | | | 4.2 | 105.5 | 3.1 | 80 | 7.4 | 188.2 | 7.5 | 189.6 | 1.6 | 41 | 1.2 | 30 | 2.7 | 69 | 2.8 | 70 | 1-1/8" | M30 | | | | | |
| | 1-1/4" | MRTAS020004 | M33 | MRTAS020009 | | | | | | | 1.26 | 32 | 1.30 | 33 | | | 4.3 | 108.5 | 3.3 | 84 | 7.7 | 194.5 | 7.7 | 195.8 | 1.7 | 44 | 1.4 | 35 | 2.8 | 72 | 2.8 | 72 | 1-1/4" | M33 | | | | | |
| | 1-3/8" | MRTAS020005 | M36 | MRTAS020010 | | | | | | | 1.38 | 35 | 1.42 | 36 | | | 4.4 | 111.5 | 3.5 | 89 | 7.9 | 200.9 | 7.9 | 201.9 | 1.9 | 47 | 1.5 | 38 | 3.1 | 78 | 3 | 77 | 1-3/8" | M36 | | | | | |
| (MRT3) MRTAS030001 | 1-1/4" | MRTAS030002 | M33 | MRTAS030006 | 148,300 | 660 | 6.822 | 4,401 | 12.98 | 5.9 | 1.26 | 32 | 1.30 | 33 | 4.9 | 147.5 | 4.3 | 108.5 | 3.5 | 88 | 7.7 | 196.5 | 7.8 | 197.8 | 1.7 | 44 | 1.4 | 35 | 3.1 | 79 | 3.1 | 80 | 1-1/4" | M33 | (MRT3) MRTAS030001 | | | | |
| | 1-3/8" | MRTAS030003 | M36 | MRTAS030007 | | | | | | | 1.38 | 35 | 1.42 | 36 | | | 4.4 | 111.5 | 3.8 | 96 | 8 | 203 | 8 | 204 | 1.9 | 47 | 1.5 | 38 | 3.2 | 81 | 3.2 | 81 | 1-3/8" | M36 | | | | | |
| | 1-1/2" | MRTAS030004 | M39 | MRTAS030008 | | | | | | | 1.50 | 38 | 1.54 | 39 | | | 4.5 | 115 | 3.8 | 96 | 8.2 | 209.2 | 8.3 | 210.1 | 2 | 50.5 | 1.7 | 42 | 3.3 | 84 | 3.3 | 84 | 1-1/2" | M39 | | | | | |
| | 1-5/8" | MRTAS030005 | M42 | MRTAS030009 | | | | | | | 1.61 | 41 | 1.65 | 42 | | | 4.6 | 118 | 4.1 | 105 | 8.5 | 215.6 | 8.5 | 216.3 | 2.1 | 53.5 | 1.6 | 41 | 3.6 | 91 | 3.6 | 91 | 1-5/8" | M42 | | | | | |
| | 1-1/4" | MRTAS040003 | M39 | MRTAS040008 | | | | | | | 1.26 | 32 | 1.54 | 39 | | | 4.6 | 116 | 4.4 | 112 | 8.5 | 215.2 | 8.5 | 216.1 | 2 | 50.5 | 1.7 | 42 | 3.7 | 94 | 3.7 | 94 | 1-1/4" | M39 | | | | | |
| (MRT4) MRTAS040001 | 1-5/8" | MRTAS040004 | M42 | MRTAS040009 | 224,700 | 1,000 | 10.335 | 6,668 | 18.7 | 8.5 | 1.61 | 41 | 1.65 | 42 | 5.8 | 147.5 | 4.7 | 119 | 4.5 | 114 | 8.7 | 222 | 8.7 | 222 | 2.1 | 53.5 | 1.8 | 45 | 3.8 | 96 | 3.8 | 96 | 1-5/8" | M42 | (MRT4) MRTAS040001 | | | | |
| | 1-3/4" | MRTAS040005 | M45 | MRTAS040010 | | | | | | | 1.73 | 44 | 1.77 | 45 | | | 4.8 | 122.5 | 4.6 | 118 | 9 | 227.9 | 9 | 228.5 | 2.2 | 57 | 2 | 52 | 3.9 | 100 | 3.9 | 100 | 1-3/4" | M45 | | | | | |
| | 1-7/8" | MRTAS040006 | M48 | MRTAS040011 | | | | | | | 1.89 | 48 | 1.89 | 48 | | | 4.9 | 125.5 | 4.5 | 114 | 9.2 | 234.3 | 9.2 | 234.6 | 2.4 | 60 | 2 | 51 | 4 | 101 | 4 | 101 | 1-7/8" | M48 | | | | | |
| | 2" | MRTAS040007 | - | - | | | | | | | 2.01 | 51 | - | - | | | 5.1 | 128.5 | 4.7 | 120 | 9.5 | 241 | - | - | 2.5 | 63 | 2 | 52 | 4.2 | 107 | - | - | 2" | - | | | | | |
| | 2" | MRTAS050003 | M52 | MRTAS050007 | | | | | | | 2.01 | 51 | 2.05 | 52 | | | 5.2 | 132 | 4.7 | 120 | 9.9 | 250.6 | 9.9 | 251.8 | 2.5 | 63 | 2 | 52 | 4.6 | 117 | 4.6 | 117 | 2" | M52 | | | | | |
| (MRT5) MRTAS050001 | 2-1/4" | MRTAS050004 | M56 | MRTAS050008 | 337,200 | 1,500 | 15.505 | 10,003 | 30.8 | 14 | 2.24 | 57 | 2.20 | 56 | 7.1 | 180.5 | 5.5 | 138.5 | 5.4 | 138 | 10.4 | 263.3 | 10.3 | 262.2 | 2.7 | 69.5 | 2.3 | 58 | 4.8 | 121 | 4.7 | 119 | 2-1/4" | M56 | (MRT5) MRTAS050001 | | | | |
| | - | - | M60 | MRTAS050009 | | | | | | | - | - | 2.36 | 60 | | | 5.5 | 138.5 | 5.4 | 138 | - | - | 10.5 | 266 | 2.7 | 69.5 | 2.3 | 58 | - | - | 4.8 | 122 | - | M60 | | | | | |
| | 2-1/2" | MRTAS050005 | M64 | MRTAS050010 | | | | | | | 2.52 | 64 | 2.52 | 64 | | | 5.7 | 145 | 6 | 153 | 10.9 | 276 | 10.9 | 276.5 | 3 | 76 | 2.5 | 63 | 5.3 | 134 | 5.2 | 132 | 2-1/2" | M64 | | | | | |
| | - | - | M68 | MRTAS050011 | | | | | | | - | - | 2.68 | 68 | | | 5.7 | 145 | 6 | 153 | - | - | 11 | 280.5 | 3 | 76 | 2.5 | 63 | - | - | 5.3 | 135 | - | M68 | | | | | |
| | - | - | M70 | MRTAS050012 | | | | | | | - | - | 2.76 | 70 | | | 5.7 | 145 | 6 | 153 | - | - | 11.1 | 282.5 | 3 | 76 | 2.5 | 63 | - | - | 5.3 | 135 | - | M70 | | | | | |
| | 2-3/4" | MRTAS050006 | - | - | | | | | | | 2.76 | 70 | - | - | | | 5.9 | 150 | 6.1 | 156 | 11.4 | 289 | - | - | 3.2 | 81 | 2.8 | 70 | 5.6 | 141 | - | - | 2-3/4" | - | | | | | |
| (MRT6) MRTAS060001 | 2-3/4" | MRTAS060003 | M72 | MRTAS060007 | 562,000 | 2,500 | 25.84 | 16,671 | 50.6 | 23 | 2.01 | 51 | 2.83 | 72 | 8.9 | 227 | 5.9 | 151 | 6.2 | 157 | 11.8 | 298.7 | 11.8 | 300.9 | 3.2 | 82 | 2.8 | 72 | 5.9 | 149 | 5.9 | 151 | 2-3/4" | M72 | (MRT6) MRTAS060001 | | | | |
| | 3" | MRTAS060004 | M76 | MRTAS060008 | | | | | | | 2.99 | 76 | 2.99 | 76 | | | 6.2 | 158 | 7.2 | 182 | 12.3 | 311.4 | 12.3 | 311.2 | 3.5 | 89 | 3.1 | 80 | 6.3 | 160 | 6.1 | 156 | 3" | M76 | | | | | |
| | - | - | M80 | MRTAS060009 | | | | | | | - | - | 3.15 | 80 | | | 6.2 | 158 | 7.2 | 182 | - | - | 12.4 | 315.2 | 3.5 | 89 | 3.1 | 80 | - | - | 6.2 | 158 | - | M80 | | | | | |
| | 3-1/4" | MRTAS060005 | M85 | MRTAS060010 | | | | | | | 3.27 | 83 | 3.35 | 85 | | | 6.5 | 164 | 7.5 | 190 | 12.8 | 324.1 | 12.9 | 326.6 | 3.7 | 95 | 3.3 | 84 | 6.7 | 169 | 6.5 | 165 | 3-1/4" | M85 | | | | | |
| | 3-1/2" | MRTAS060006 | M90 | MRTAS060011 | | | | | | | 3.50 | 89 | 3.54 | 90 | | | 6.7 | 170 | 8.1 | 205 | 13.3 | 336.8 | 13.3 | 337.9 | 4 | 101 | 3.5 | 88 | 7.2 | 182 | 7 | 179 | 3-1/2" | M90 | | | | | |
| (MRT7) MRTAS070001 | 3-1/2" | MRTAS070003 | M90 | MRTAS070006 | 719,300 | 3,200 | 33 | 21,339 | 70.4 | 32 | 3.50 | 89 | 3.54 | 90 | 10 | 252 | 6.8 | 173 | 7.9 | 200 | 13.6 | 346 | 13.7 | 347 | 4 | 101 | 3.5 | 88 | 7.1 | 180 | 6.9 | 176 | 3-1/2" | M90 | (MRT7) MRTAS070001 | | | | |
| | - | - | M95 | MRTAS070007 | | | | | | | - | - | 3.74 | 95 | | | 0 | 6.8 | 173 | 7.9 | 200 | - | - | 13.9 | 351.9 | 101 | 3.5 | 88 | - | - | 7 | 179 | - | M95 | | | | | |
| | 3-3/4" | MRTAS070004 | M100 | MRTAS070008 | | | | | | | 3.74 | 95 | 3.94 | 100 | | | 0 | 7 | 179 | 7.9 | 200 | 14.1 | 358.5 | 14.3 | 363.3 | 107 | 3.7 | 94 | 7.3 | 185 | 7.3 | 185 | 3-3/4" | M100 | | | | | |
| | 4" | MRTAS070005 | - | - | | | | | | | 4.02 | 102 | - | - | | | 0 | 7.3 | 186 | 8.3 | 210 | 14.6 | 371.2 | - | - | 114 | 4.5 | 114 | 7.5 | 190 | - | - | 4" | - | | | | | |

To convert to long tons, divide lbf by 2240. To convert to short tons, divide lbf by 2000.

For smaller or larger sizes, see SRT product pages.

| | | | |
|------------|--------------|------------------------------|-------------|
| Toggle Bar | 10mm x 200mm | SRT/MRT (up to 1-7/8" - M48) | INTTB000010 |
| | 14mm x 200mm | SRT/MRT (2" - M52 and above) | INTTB000014 |

WIND TENSIONERS WD/WS



WDD



WSS & WSL



WSD



Tensioner Pumps pages 91-99

WIND TENSIONERS

Our tensioners have quality designed in with standard features that enhance durability and efficiency to get the job done faster and safer:

Quality Means Lower Life-Cycle Costs:

- Achieves 90% proof load requirement for ISO 898 Grade 10.9 bolts
- Fully enclosed load cell eliminates debris in piston retraction mechanism
- Auto-Engaging Geared Nut Rotator
- Self-energizing, long life seals

Enhanced Usability:

- Piston stroke limit indication
- High pressure swivel coupling (swivel is optional on WSS & WSL)
- 1,350 bar (19,580 psi maximum operating pressure)
- Automatic piston retraction mechanism

Designed with Safety in Mind:

- Overstroke prevention for safe operation
- Anti-slip grip surface
- Tool lifting-strap as standard

Note: Certain tensioners may require minimum order quantity - consult factory for details.

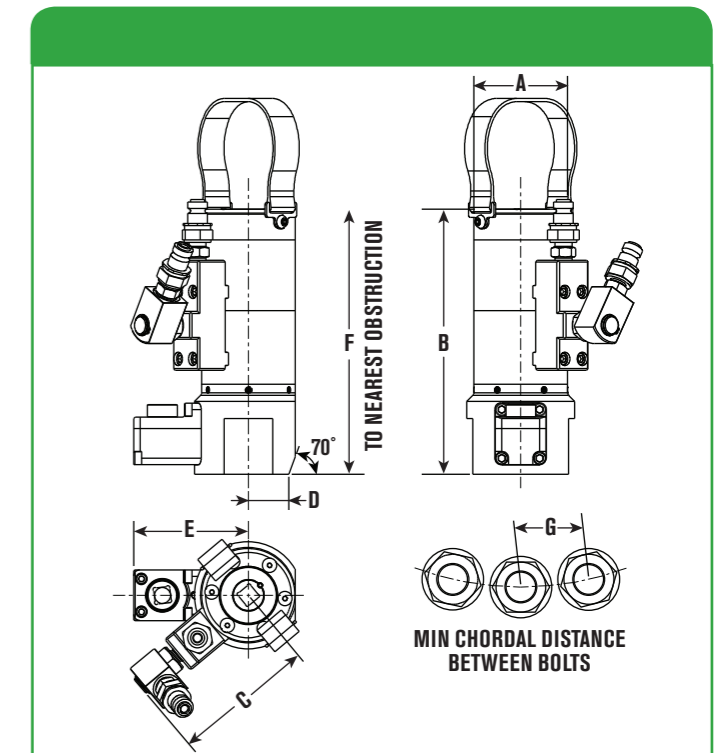


WIND TENSIONERS UP TOWER - WDD

Specifications and Dimensional Data

WDD UP TOWER WIND TENSIONERS

- Robust Gearbox Drive
- Auto-Engaging Geared Nut Rotator
- Small diameter, high load 2-Stage hydraulic load cell
- Fast application using 1/2" drive
- Cycle counter optional (Add "A" to end of part number)
- Max Pressure: 1,350 bar (19,580 psi)
- Twin coupling optional (Add "TC" to end of part number)



| Tool Ref | A mm | B mm | C mm | D mm | E mm | F mm | G mm |
|----------|---------|---------|---------|---------|---------|---------|---------|
| WDD1-M30 | 74 | 210 | 112 | 37 | 91 | 290 | 64 |
| WDD2-M33 | 79 | 214 | 115 | 39.5 | 93 | 298 | 70 |
| WDD3-M36 | 85 | 239 | 117 | 42.5 | 96 | 332 | 76 |
| WDD4-M39 | 92 | 249 | 121 | 46 | 99 | 348 | 79 |
| WDD5-M42 | 98 | 255 | 124 | 49 | 102 | 360 | 90 |

Ordering Information

| Order No. | Metric | Required Thread Protrusion mm | Stroke mm | Max Load kN | Hyd Area sq. mm | Wt kg |
|-----------|--------|-------------------------------------|--------------|----------------|--------------------|----------|
| WDD1-M30 | M30 | 63 - 70 | 7 | 467 | 3458 | 6.70 |
| WDD2-M33 | M33 | 67 - 74 | 7 | 569 | 4215 | 7.60 |
| WDD3-M36 | M36 | 71 - 80 | 10 | 671 | 4970 | 9.25 |
| WDD4-M39 | M39 | 72 - 86 | 10 | 801 | 5931 | 11.10 |
| WDD5-M42 | M42 | 80 - 92 | 10 | 926 | 6856 | 12.60 |

For twin hydraulic couplings (for multiple tool connection) add "TC" after part number. For cycle counter option, add "A" after code (eg. WDD1-M30A, WDD1-M30TCA)

WIND TENSIONERS COMPACT TOWER - WSD



WSS & WSL FOUNDATION WIND TENSIONERS

- Suitable for ISO Metric threaded and all-thread bars
- Geared or Manual Nut Rotator
- Long & short stroke models
- Maximum operating pressure 1350 bar (19,580 psi)
- Uses standard system 'nut' for reaction
- Contact factor for optional swivel coupling



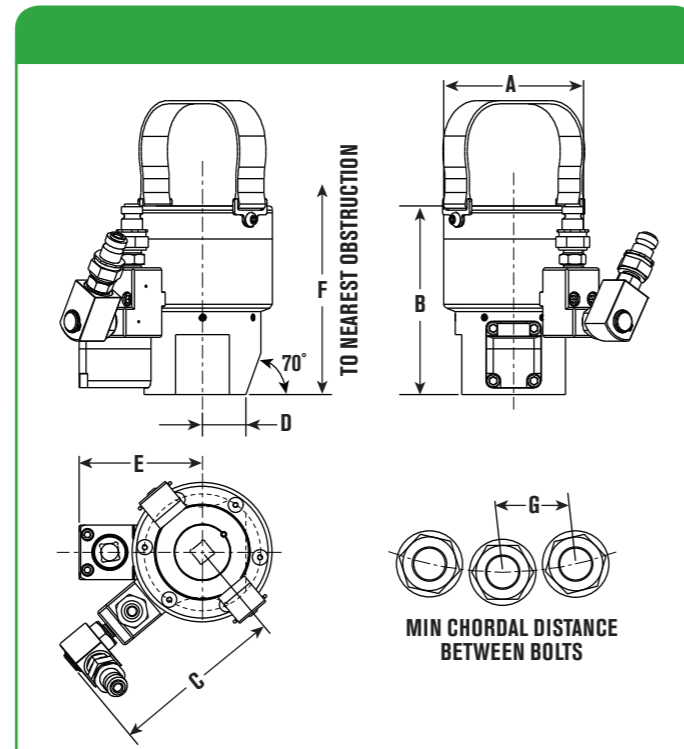
WIND TENSIONERS FOUNDATION - WSS & WSL

Specifications and Dimensional Data

WSD COMPACT TOWER WIND TENSIONERS

- Robust Gearbox Drive
- Auto-Engaging Geared Nut Rotator
- Low height hydraulic load cell
- Fast application using 1/2" drive
- Cycle counter optional (Add "A" to end of part number)
- Maximum operating pressure 1350 bar (19,580 psi)
- Twin coupling optional (Add "TC" to end of part number)

Note: Certain tensioners may require minimum order quantity - consult factory for details.



| Tool Ref | A mm | B mm | C mm | D mm | E mm | F mm | G mm |
|----------|------|------|------|------|------|------|------|
| WSD1-M30 | 103 | 138 | 127 | 32 | 91 | 211 | 68 |
| WSD2-M33 | 112 | 140 | 132 | 35 | 93 | 218 | 74 |
| WSD3-M36 | 122 | 149 | 136 | 37 | 96 | 233 | 82 |
| WSD4-M39 | 133 | 153 | 142 | 42 | 99 | 238 | 88 |
| WSD5-M42 | 140 | 157 | 146 | 45 | 102 | 250 | 93 |

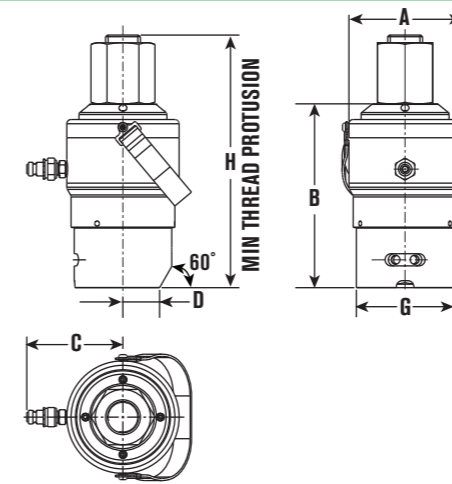
Ordering Information

| Order No. | Metric | Required Thread Protrusion mm | Stroke mm | Max Load kN | Hyd Area sq. mm | Wt kg |
|-----------|--------|-------------------------------|-----------|-------------|-----------------|-------|
| WSD1-M30 | M30 | 63 - 81 | 7 | 467 | 3458 | 6.60 |
| WSD2-M33 | M33 | 67 - 86 | 7 | 569 | 4215 | 7.60 |
| WSD3-M36 | M36 | 71 - 93 | 10 | 671 | 4970 | 8.80 |
| WSD4-M39 | M39 | 72 - 95 | 10 | 801 | 5931 | 11.20 |
| WSD5-M42 | M42 | 80 - 96 | 10 | 926 | 6856 | 12.20 |

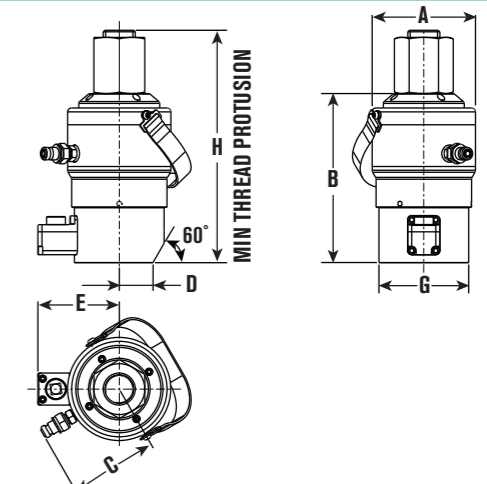
For twin hydraulic couplings (for multiple tool connection) add "TC" after part number. For cycle counter option, add "A" after code (eg. WDD1-M30A, WDD1-M30TCA)

Specifications and Dimensional Data

Manual Nut Rotation Version



Gearbox Nut Rotation Version



| Tool Ref | A mm | B mm | C mm | D mm | E mm | G mm | H mm |
|---------------|------|------|------|------|------|------|------|
| WSS1/WSS1-10 | 103 | 158 | 98 | 42 | 99 | 103 | 206 |
| WSS1/WSS1-11 | 103 | 158 | 98 | 42 | 99 | 103 | 219 |
| WSL1/WSL1-10 | 114 | 205 | 103 | 42 | 99 | 130 | 255 |
| WSL1/WSL1-11 | 114 | 205 | 103 | 42 | 99 | 103 | 266 |
| WSS2/WSS2-125 | 119 | 168 | 105 | 42 | 102 | 112 | 226 |
| WSS2/WSS2-138 | 119 | 168 | 105 | 42 | 102 | 112 | 238 |
| WSL2/WSL2-125 | 129 | 211 | 110 | 42 | 102 | 112 | 269 |
| WSL2/WSL2-138 | 129 | 211 | 110 | 42 | 102 | 112 | 280 |

Ordering Information

| Load Cell Order No. | Adaptor Kit** Order No. | Bar Size | Stroke mm | Max Load kN | Hyd Area sq mm | Wt kg |
|--|-------------------------|----------|-----------|-------------|----------------|-------|
| FOR GRADE 75 ksi ALL THREAD FOUNDATION BOLTS | | | | | | |
| WSS1 | WSS1-10 | #10 | 10 | 470 | 3481 | 5.74 |
| | WSS1-11 | #11 | | | | 5.85 |
| WSL1 | WSL1-10 | #10 | 25 | 470 | 3481 | 9.00 |
| | WSL1-11 | #11 | | | | 9.20 |
| FOR GRADE 150 ksi ALL THREAD FOUNDATION BOLTS | | | | | | |
| WSS2 | WSS2-125 | 1-1/4" | 10 | 760 | 5630 | 8.20 |
| | WSS2-138 | 1-3/8" | | | | 8.30 |
| WSL2 | WSL2-125 | 1-1/4" | 25 | 760 | 5630 | 12.30 |
| | WSL2-138 | 1-3/8" | | | | 12.40 |

**For manual nut rotation Adaptor Kit add "M" after part number, for gearbox style nut rotation add "GB".
Note: For a complete tensioner, order load cell and adapter kit.

OTHER TOOLS

HIGH PERFORMANCE HIGH FORCE HYDRAULICS

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ENS...48-49
Hydraulic Nut Splitters



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Hydraulic Nut Splitters



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Pipe Flange Spreader



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EHN...57
Hydraulic Nut



NUT SPLITTERS

HYDRAULIC - ENS

3/4" to 3-1/2" bolt diameter
M20 to M90



SINGLE ACTING



DOUBLE ACTING
Ideal for Subsea use

Double acting (subsea) version comes standard with 700 bar, 1/4" NPT, Push to Connect (PTC) couplers. To use with top side pumps, change out couplers to 700 bar, 1/4" NPT, Screw-to-connect style. See page 102 for coupler details.

ENS HYDRAULIC NUT SPLITTER

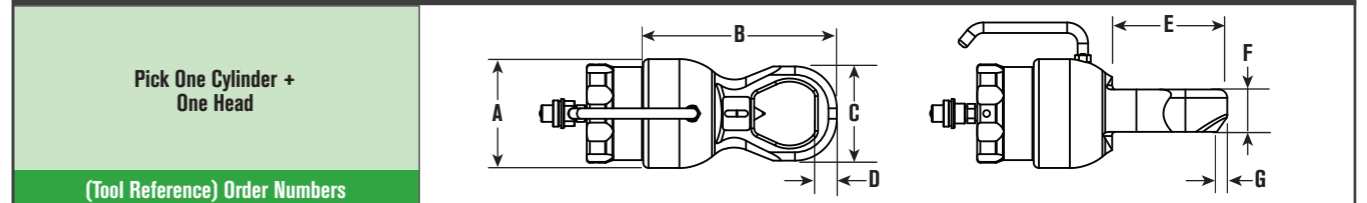
Our hydraulic nut splitter offers a reliable and effective solution to the removal of seized and corroded nuts.

- Triple edge replaceable cutting blade
- Blade positioning scale to eliminate bolt damage
- Cutting depth fixed - Nut size adjustable via rotating cylinder!
- Size range from 3/4" to 3-1/2" bolt diameters
- Designed to fit ANSI, ASME B.16.5 flanges
 - Will work with some API flanges – contact factory for details
- Twin line hydraulic version available for subsea use
- Versatile, reliable and trouble-free operations
- Operates off a standard 10,000 psi (700 bar) pump unit
- Built-in safety relief valve to protect tool & operator

OK FOR SUBSEA



Specifications and Dimensional Data



| STANDARD | | OPTIONAL | | Head | Bolt Dia. | Nut A/F | Bolt Dia. | Nut A/F | A | | B | | C | | D | | E | | F | | G | | Wt | | | | | | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------|-----------|---------|-----|------|-----|------|------|-----|------|-----|------|-----|-------|-----|------|------|----------|------|------|-----|-----|-----|------|-----|-------|------|-----|-----|-----|-------|------|----|-------|----|------|
| Standard Cylinder Single Acting | Subsea Cylinder Double Acting | Imperial | in | | | | | | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | kg | lb | | | | | | | | | | | | | | | |
| (ENS1) ENSAS010001 | (ENS1) ENSAS010002 | (ENS1-1) ENSAS010004 | 3/4" | 1-1/4" | M20 | 30 | 104 | 4.1 | 228 | 9.0 | 76 | 3.0 | 18 | 0.7 | 104 | 4.1 | 40.5 | 1.6 | 9 | 0.4 | 6.7 | 14.8 | | | | | | | | | | | | | | | | | | | |
| | | | 7/8" | 1-7/16" | M22 | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1" | 1-3/8" | M24 | 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | M27 | 41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | M20 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | M22 | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | M24 | 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | M27 | 41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | M30 | 46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | M33 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | (ENS2) ENSAS020001 | (ENS2) ENSAS020004 | (ENS2-1) ENSAS020002 | 1-1/8" | 1-13/16" | M30 | 46 | 138 | 5.4 | 305 | 12.0 | 102 | 4.0 | 22 | 0.9 | 132 | 5.2 | 57.5 | 2.3 | 6 | 0.2 | 15.8 | 34.8 | | | | | | | | | | | | | | | | | |
| | | | | | 1-1/4" | 2" | M33 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-3/8" | 2-3/16" | | | | M36 | 55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-1/2" | 2-3/8" | | | | M39 | 60 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (ENS2-2) ENSAS020003 | 1-1/8" | | | 1-13/16" | M30 | 46 | 138 | 5.4 | 314 | 12.4 | 114 | 4.5 | 23 | 0.9 | 141 | 5.6 | 57.5 | 2.3 | 6 | 0.2 | 16 | 35.3 | | | | | | | | | | | | | | | | | | | |
| | 1-1/4" | | | 2" | M33 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1-3/8" | | | 2-3/16" | M36 | 55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1-1/2" | | | 2-3/8" | M39 | 60 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1-5/8" | | | 2-9/16" | M42 | 65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1-3/4" | | | 2-3/4" | M45 | 70 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | (ENS3) ENSAS030001 | | | (ENS3) ENSAS030006 | (ENS3-1) ENSAS030002 | 1-3/4" | | | | | | | | | | | | | | | | | 2-3/4" | M45 | 70 | 190 | 7.5 | 406 | 16.0 | 132 | 5.2 | 28 | 1.1 | 189 | 7.4 | 80.5 | 3.2 | 8 | 0.3 | 42 | 92.6 |
| | | | | | | 1-7/8" | | | | | | | | | | | | | | | | | 2-15/16" | M48 | 75 | | | | | | | | | | | | | | | | |
| 2" | | 3-1/8" | M52 | | | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (ENS3-2) ENSAS030003 | | 1-3/4" | 2-3/4" | | M45 | 70 | 190 | 7.5 | 416 | 16.4 | 145 | 5.7 | 30 | 1.2 | 199 | 7.8 | 80.5 | 3.2 | 8 | 0.3 | 42.5 | 93.7 | | | | | | | | | | | | | | | | | | | |
| | | 1-7/8" | 2-15/16" | | M48 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 2" | 3-1/8" | | M52 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 2-1/4" | 3-1/2" | | M56 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1-3/4" | 2-3/4" | | M45 | 70 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1-7/8" | 2-15/16" | | M48 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (ENS3-3) ENSAS030004 | | 2" | 3-1/8" | | M52 | 80 | 190 | 7.5 | 426 | 16.8 | 160 | 6.3 | 31.5 | 1.2 | 200 | 7.9 | 80.5 | 3.2 | 7 | 0.3 | 43 | 94.8 | | | | | | | | | | | | | | | | | | | |
| | | 2-1/4" | 3-1/2" | | M56 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 2-1/2" | 3-7/8" | | M60 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | M64 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | M68 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | M72 | 105 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | (ENS3-4) ENSAS030005 | 1-3/4" | 2-3/4" | M45 | 70 | 190 | | | | | | | | | | | | | | | | | 7.5 | 437 | 17.2 | 174 | 6.9 | 35 | 1.4 | 204 | 8.0 | 80.5 | 3.2 | 9 | 0.4 | 44 | 97.0 | | | | |
| | | 1-7/8" | 2-15/16" | M48 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 2" | 3-1/8" | M52 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 2-1/4" | 3-1/2" | M56 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-1/2" | | 3-7/8" | M60 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-3/4" | | 4-1/4" | M64 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | M68 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | M72 | 105 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (ENS4) ENSAS040001 | | (ENS4) ENSAS040004 | (ENS4-1) ENSAS040002 | 2-3/4" | 4-1/4" | | M76 | 110 | 235 | 9.3 | 474 | 18.7 | 189 | 7.4 | 36.5 | 1.4 | 235 | 9.3 | 110.5 | 4.4 | 4 | 0.2 | | | | | | | | | | | | | | | | 73 | 160.9 | | |
| | | | | 3" | 4-5/8" | | M80 | 115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | (ENS4-2) ENSAS040003 | | 2-3/4" | 4-1/4" | M76 | 110 | 235 | 9.3 | | | | | | | | | | | | | | | 495 | 19.5 | 219 | 8.6 | 41 | 1.6 | 240 | 9.4 | 110.5 | 4.4 | 3 | 0.1 | 75 | 165.3 | | | | | |
| | | | 3" | 4-5/8" | M80 | 115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 3-1/4" | 5" | M85 | 120 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 3-1/2" | 5-3/8" | M90 | 130 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Order a cylinder and a head to make complete nutsplitter. Cylinders are interchangeable with heads within specific size ranges. Each are sold separately.

Ordering Information

- TO SPECIFY AN ENS SOLUTION:**
1. Use the table located on the next page to identify the nut you need to split and select the appropriate head.
 2. Select a single or double acting cylinder. For subsea applications only select double acting cylinders.
 3. Order extra cutting blades (optional).

Accessory Ordering Information

| Order No. | Description |
|-------------|------------------------|
| ENSBLO10001 | Cutting blade for ENS1 |
| ENSBLO20001 | Cutting blade for ENS2 |
| ENSBLO30001 | Cutting blade for ENS3 |
| ENSBLO40001 | Cutting blade for ENS4 |

HYDRAULIC SPREADER

FLS15

15 Metric Ton Capacity
700 bar/10,000 psi



FLS15
WITH SERRATED SHOES—WEDGE FULLY OPENED



FLS15-ST
WITH STEPPED SHOES—WEDGE CLOSED



FLS15 HYDRAULIC SPREADER

SPX FLOW Bolting Systems is pleased to introduce the FLS15 hydraulic spreader. This unit is ideal for pipe and flange repair. It can also be used for removing elbows, gasket and metal seal replacement on couplers, heavy equipment maintenance, and many other tasks. The spreader is capable of developing up to 15 metric tons of force, is lightweight, and easy to use due to its ergonomic design.

- 33,000 pound (15 metric ton) wedge-driven spreader
- Jaws fully supported by wedge for excellent durability
- Low friction provided by heavy-duty extended-life lubricant
- Ideal for flanges with narrow gaps - only .2 inches (5 mm) required for entry
- Very high strength due to special alloy used
- Compact and lightweight design - only 11.28 inches (287 mm) long at a weight of 7 pounds (3.2 kg)
- Easy to use - ergonomically balanced handle (optional)
- Suitable for the offshore environment due to superior corrosion resistance
- Quick adjustments for various tasks due to interchangeable shoes (both stepped and serrated)
- Easy and quick maintenance - Only T40 Torx tool required
- Includes female half coupler - mates to standard 3/8" male half coupler (No. 9798)
- Both serrated- and stepped-shoe versions available

FLS15 HYDRAULIC SPREADER

This hydraulic spreader operates using the integrated wedge concept. It is ideal for creating space for flange surface cleaning and repair, and for gasket replacement. The spreader is single-acting, and should be used with a hydraulic pump capable of holding pressure. Maximum operating pressure is 10,000 psi (700 bar).

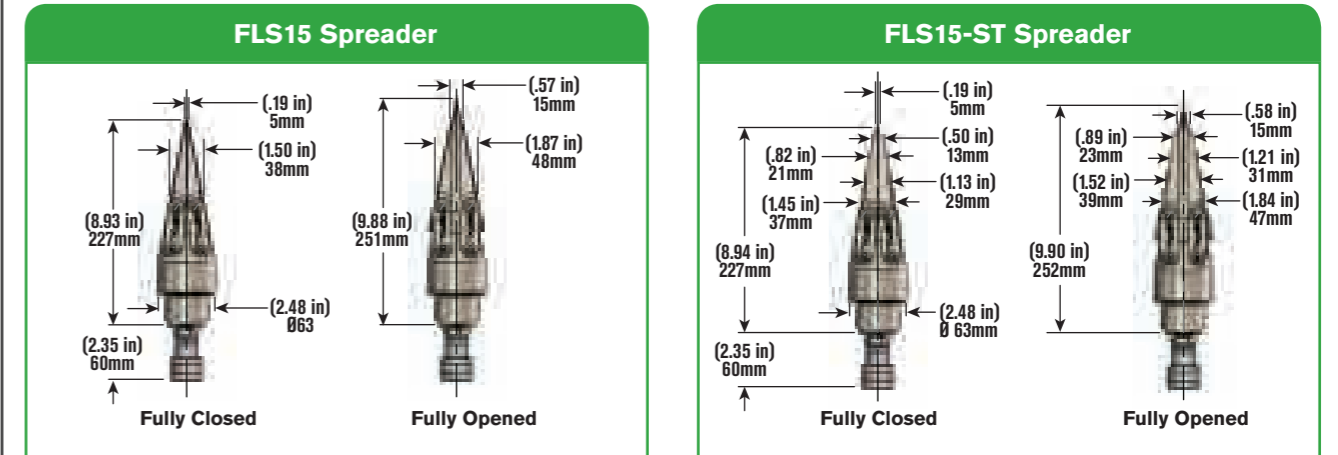
Spreading Force:

Maximum 33,000 lb (15 metric tons) per tool at 10,000 psi (700 bar). It is recommended that the tools be used in pairs, providing a maximum combined force of 66,000 lb (30 metric tons).

Typical Applications:

- Pipe and flange repair
- Removing elbows
- Couplers - gasket and metal seal replacement
- Heavy equipment maintenance

Specifications and Dimensional Data



| Order No. | Maximum Spreading Force | Minimum Tip Clearance | Maximum Tip Spread | Spreader Type | Oil Capacity | Weight | Maximum Operating Pressure |
|-------------------|--------------------------------|-----------------------|--------------------|---------------|----------------------|-------------------|----------------------------|
| FLS15 or FLS15-ST | 33,000 Pounds (15 Metric Tons) | .197 Inches (5 mm) | .59 Inches (15 mm) | Hydraulic | 1 Cubic Inch (16 cc) | 7 Pounds (3.2 kg) | 10,000 psi (700 bar) |

Available FLS15 Accessories



*Two shoes required per spreader.

Recommended Components

| Description | Part Number (Americas & Asia) | Part Number (Europe) |
|---------------------------------------|-------------------------------|-----------------------------|
| Two Speed, Single-Acting Hand Pump | P19L | P19L |
| Hydraulic Hose Assembly | 9764 | 9764E |
| Pressure Gauge | 9040 (Primary Units = psi) | 9040E (Primary Units = bar) |
| Gauge Adapter | 9670 | 9670 |
| Coupler (male half coupler) | 9798 | 9798 |
| 2 Station Manifold with Needle Valves | 9642 | 9642 |
| Female Half Coupler | 9796 | 9796 |
| Male Connector, 3/8 | 9682 | 9682 |

HYDRAULIC SPREADER KIT FLS15 KIT (TOPSIDE CASE)

15 Metric Ton Capacity
700 bar/10,000 psi



*The spreader kit is available in various combinations, with a standard-duty case that is easy to transport.

FLS FLANGE SPREADER KIT

- Standard duty blow molded case organizes and protects the complete spreading kit
- Extra storage space for additional step shoes and up to 3 step blocks
- 15 metric ton wedge-driven spreader
- Jaws fully supported by wedge for excellent durability



FLS FLANGE SPREADER KIT

- Heavy duty case is more rugged and compact, ideal for offshore applications
- Weather proof gasket seal and pressure equalization valve
- Tighter product spacing for easier helicopter transport
- 15 metric ton wedge-driven spreader
- Jaws fully supported by wedge for excellent durability
- All kits are CE rated.



HYDRAULIC SPREADER KIT FLS15 KIT (OFFSHORE CASE)

15 Metric Ton Capacity
700 bar/10,000 psi



*Spreader kit in various combinations available, all in a heavy duty cases; easy to transport and stock.

FLS15 KIT (TOPSIDE CASE)

| | | Order No | | | | | | | |
|----------------|--|-----------|-----------|--------------|--------------|-----------|-----------|--------------|--------------|
| Kit Components | | FLS15-FBK | FLS15-MBK | FLS15-FBK-ST | FLS15-MBK-ST | FLS15-FBP | FLS15-MBP | FLS15-FBP-ST | FLS15-MBP-ST |
| Component | Description | CE | CE | CE | CE | | | | |
| FLS15 | Spreader, Hydraulic | 2 | 1 | - | - | 2 | 1 | - | - |
| FLS15-ST | Spreader, Hydraulic Stepped | - | - | 2 | 1 | - | - | 2 | 1 |
| SB15 | Aluminum Holding Block | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 |
| P19L | Lightweight Hand Pump | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Manifold Assy | Manifold, 2 Needle Valve Assembly (Incl. 2 Gauges) | 1 | - | 1 | - | 1 | - | 1 | - |
| 2008410 | Handle for FLS15 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 |
| 2008650 | Standard Case | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 9765E | Hose | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 9767E | Hose | 2 | - | 2 | - | 2 | - | 2 | - |

FLS15 KIT (OFFSHORE CASE)

| | | Order No | | | |
|----------------|--|-------------------------------|------------------------------|-----------------------------|----------------------------|
| Kit Components | | FLS15-FSK | FLS15-FSK-ST | FLS15-MSK | FLS15-MSK-ST |
| Component | Description | Spreader kit Tandem, Serrated | Spreader kit Tandem, Stepped | Spreader only kit, Serrated | Spreader only kit, Stepped |
| FLS15 | Spreader, Hydraulic | 2 | - | 1 | - |
| FLS15-ST | Spreader, Hydraulic Stepped | - | 2 | - | 1 |
| SB15 | Aluminum Holding Block | 2 | 2 | 1 | 1 |
| P19L | Lightweight Hand Pump with Gauge | 1 | 1 | - | - |
| 3000827 | Manifold, 2 Needle Valve Assembly (Incl. 2 Gauges) | 2 | 2 | - | - |
| 2008577 | Heavy Duty Case, Large | 1 | 1 | - | - |
| 3000832 | Heavy Duty Case, Small | - | - | 1 | 1 |
| 9765E | Hose | 1 | 1 | - | - |
| 9767E | Hose | 2 | 2 | - | - |

NUT SPLITTERS HYDRAULIC - HNS

15 & 25 Ton Capacity
700 bar/10,000 psi



HNS150



HNS150A



HNS225

HNS HYDRAULIC NUT SPLITTER

- “Dial-in” feature on HNS150 makes adjustment of splitter simple, without the worry of damaging the bolt
- Specially designed “tool steel” cutter blade penetrates the nut to the precise point where it cracks, stopping short of the bolt threads
- Nut splitter features a dramatically improved cutter blade with an 800% greater resistance to chipping and breaking over previous models
- All models feature a rugged one-piece cutting frame coupled to a heavy-duty hydraulic cylinder
- Compact size allows you to use it in confined areas where it will deliver enough force to split the toughest “fused” or rusted-on grade 2H nuts
- Simply split nut on one side, spin nut splitter 1/2 turn and make second cut on opposite side; nut separates into halves for easy removal
- Uses a standard 3/8" high flow coupler



Align mark on cutter blade with scale.

HS HYDRAULIC SPREADERS

- Often used to position and align heavy pipes and flanges for easier bolting.
- Conforms to ASME B30.1 standard.
- High strength alloy steel forged upper and lower jaws on HS2000.
- Jaws are spring-return; retract automatically when pressure is released.
- Uses a standard 3/8" high flow coupler



HS2000
(Forged Steel)

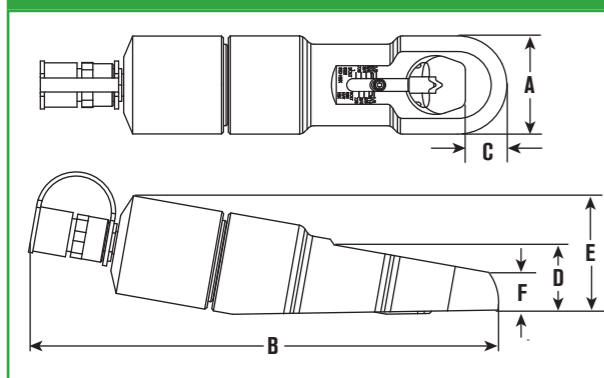


HS3000
(High Grade Ductile Iron)

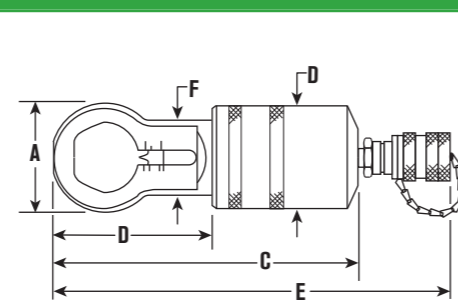


Specifications and Dimensional Data

HNS150A



HNS150 & HNS225



| Tool Model | A | B | C | D | E | F | HEAD THICKNESS | REPLACEMENT BLADE | TOOL Wt |
|------------|-------|-------|--------|-------|--------|--------|----------------|-------------------|---------|
| HNS150 | 2.875 | 3.375 | 7.875 | 2.75 | 10.375 | 2.0625 | 1 | 308840 | 8.1 |
| HNS150A | 3.02 | 14.2 | 1.03 | 2.11 | 3.7 | 1.16 | 1 | 351985 | 15.8 |
| HNS225 | 4.25 | 6 | 14.375 | 3.875 | N/A | 3.25 | 1.5 | 308022 | 29 |

CAPACITIES (by Nut Grade)

| Order No. | CAPACITIES (by Nut Grade) | | | |
|-----------|---------------------------|----------------|----------------|-----------------|
| | 2 or A in. hex | 5 or B in. hex | 8 or C in. hex | 2H in. hex |
| HNS150 | 1/2 - 1-1/2 | 1/2 - 1-1/2 | 1/2 - 1-5/16 | 1/2 - 1-1/8 |
| HNS150A | 1/2 - 1-1/2 | 1/2 - 1-1/2 | 1/2 - 1-5/16 | 1/2 - 1-1/8 |
| HNS225 | 1-1/8 - 2-1/4 | 1-1/8 - 2-1/4 | 1-1/8 - 2-1/4 | 1-1/8 - 1-11/16 |

Specifications and Dimensional Data

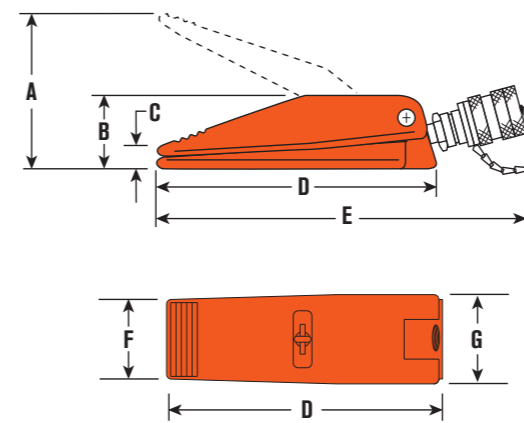
HS2000 SPECIFICATIONS

Maximum Rated Capacity: 0.91 metric tons @ 690 bar (1 short ton @ 10,000 psi)
Maximum Spread: 101 mm (4")
Minimum Clearance Required: 14.3 mm (9/16")
Oil Required: 10.3 mL (0.63 in³)

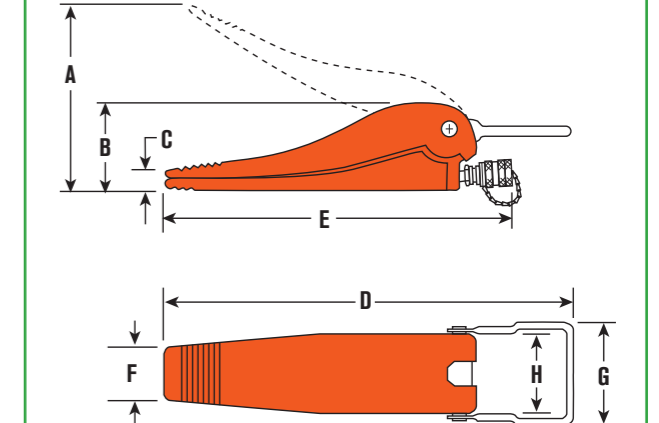
HS3000 SPECIFICATIONS

Maximum Rated Capacity: 1.36 metric tons @ 690 bar (1-1/2 short ton @ 10,000 psi)
Maximum Spread: 292 mm (11-1/2")
Minimum Clearance Required: 31.8 mm (1-1/4")
Oil Required: 57.4 mL (3.50 in³)

HS2000



HS3000



| Order Number | Capacity metric ton (short ton) | A | B | C | D | E | F | G | H | Oil Capacity mL (cu in) | Min. Clearance Required mm (in) | Wt kg (lb) |
|--------------|---------------------------------------|-----------------|----------------|------------------|------------------|-------------------|-----------------|------------------|---------------|-------------------------------|---------------------------------------|------------------|
| | | mm (in) | mm (in) | mm (in) | mm (in) | mm (in) | mm (in) | mm (in) | mm (in) | | | |
| HS2000 | 0.91 (1) | 101 (4) | 50.8 (2) | 14.3 (9/16) | 176 (6-15/16) | 236.5 (9-5/16) | 50.8 (2) | 57.1 (2-1/4) | - | 10.3 (0.63) | 14.3 (9/16) | 2.2 (4.8) |
| HS3000 | 1.36 (1-1/2) | 292 (11-1/2) | 108 (4-1/4) | 30.2 (1-3/16) | 511 (20-1/8) | 450.9 (17-3/4) | 57.1 (2-1/4) | 142.9 (5-5/8) | 92 (3-5/8) | 57.4 (3.5) | 31.8 (1-1/4) | 10 (22) |

Value(s) shown in short tons (2,000 lb). To convert to long tons, multiply by 0.893. To convert to metric tons, multiply by 0.907

PIPE FLANGE HYDRAULIC SPREADER - HFS

5 & 10 Ton Capacity
700 bar/10,000 psi



HFS3A

HFS PIPE FLANGE SPREADER

- You'll never again have to resort to "hammer and chisel" methods that waste time and effort. Flange spreaders should be used in pairs to provide even spreading force.
- Standard 60° wedge is suitable for most flanges; 30° "thin" and 60° "blunt" wedges are optional.
- The HFS3A is designed for applications where total thickness of flanges and max. spread gap is 3" or less and flange bolts are a min. of 11/16" dia.
- Use HFS6A if total thickness of flanges and max. spread gap is 6" or less, and flange bolts are a min. of 13/16" dia.
- Max working pressure 700 bar (10,000 psi)
- Uses a standard 3/8" high flow coupler

EHN TOP COLLAR HYDRAULIC NUT

Our precision machined top collar hydraulic nuts offer a quick, accurate and cost effective solution to simultaneous tightening of multiple bolted joints.

In addition to standard features normally associated with hydraulic nuts, our system also provides the following benefits:

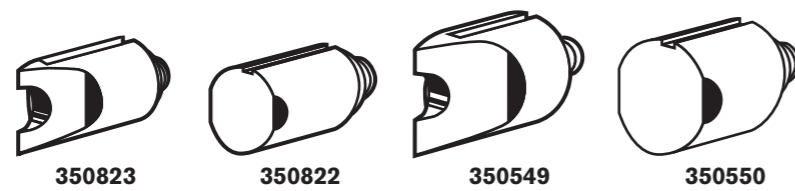
- Compact enough to fit the most confined spaces
- Maximum load generated at 1,500 bar (21,750 psi)
- Energized from either a hand operated or air driven pump
- Custom Hydraulic Nut designs available
- Alternative Bottom Collar and Shim type versions available

Note: Hydraulic Nuts will require minimum order quantity - consult factory for details.

HYDRAULIC NUT TOP COLLAR - EHN



Specifications and Dimensional Data



| Order No. | Capacity Metric tons Short tons | Standard Wedge Type | Optional Wedges | | Min. Flange Opening | | | Max. Flange Opening | | | Combined Flange Opening mm in | Min. Pin Dia. | Wt lb kg |
|-----------|---------------------------------------|---------------------|-----------------|--------|---------------------|------------|------------|---------------------|------------|------------|-------------------------------------|---------------|----------------|
| | | | 30° | 60° | 60° | 60° | 30° | 60° | 60° | 30° | | | |
| | | | Thin | Blunt | Std. Blunt | Std. Blunt | Std. Blunt | Std. Blunt | Std. Blunt | Std. Blunt | | | |
| HFS3A | 4.5 | 60° Sharp | 350823 | 350822 | 1,6 | 25,4 | 1,6 | 38,1 | 38,1 | 18,3 | 76,2 | 17,4 | 4,1 |
| | 5 | | | | 1/16" | 1" | 1/16" | 1-1/4" | 1-1/4" | 23/32" | 3-1/2" | 11/16" | 9 |
| HFS6A | 9 | 60° Sharp | 350549 | 350550 | 1,6 | 38,1 | 1,6 | 50,8 | 50,8 | 24,6 | 152,4 | 20,6 | 8,2 |
| | 10 | | | | 1/16" | 1-1/2" | 1/16" | 2" | 2" | 31/32" | 6-9/16" | 13/16" | 18 |

Value(s) shown in short tons (2,000 lb). To convert to long tons, multiply by 0.893. To convert to metric tons, multiply by 0.907.

Specifications and Dimensional Data

| Tool Ref. | THREAD | | INITIAL LOAD | | HYDRAULIC AREA | | NUT DIAM. mm | HEIGHT mm | STROKE mm |
|-----------|--------|-------|--------------|--------|-----------------|-----------------|-----------------|--------------|--------------|
| | Metric | in | kN | Ton F | mm ² | in ² | | | |
| EHN1-TC | M20 | 3/4 | 180 | 18.07 | 1200 | 1.86 | 68 | 55 | 5 |
| EHN2-TC | M22 | 7/8 | 180 | 18.07 | 1200 | 1.86 | 68 | 55 | 5 |
| EHN3-TC | M24 | 1 | 195 | 19.57 | 1300 | 2.02 | 72 | 55 | 5 |
| EHN4-TC | M27 | 1-1/8 | 210 | 21.08 | 1400 | 2.17 | 75 | 55 | 5 |
| EHN5-TC | M33 | 1-1/4 | 250 | 25.09 | 1667 | 2.58 | 82 | 57 | 5 |
| EHN6-TC | M36 | 1-3/8 | 300 | 30.11 | 2001 | 3.10 | 88 | 57 | 5 |
| EHN7-TC | M39 | 1-1/2 | 340 | 34.12 | 2267 | 3.51 | 93 | 58 | 5 |
| EHN8-TC | M42 | 1-5/8 | 400 | 40.15 | 2667 | 4.13 | 100 | 62 | 6 |
| EHN9-TC | M45 | 1-3/4 | 460 | 46.17 | 3067 | 4.75 | 106 | 64 | 6 |
| EHN10-TC | M48 | 1-7/8 | 500 | 50.18 | 3334 | 5.17 | 110 | 64 | 6 |
| EHN11-TC | M52 | 2 | 560 | 56.20 | 3734 | 5.79 | 117 | 67 | 6 |
| EHN12-TC | M56 | 2-1/4 | 720 | 72.26 | 4801 | 7.44 | 128 | 74 | 8 |
| EHN13-TC | M64 | 2-1/2 | 900 | 90.33 | 6002 | 9.30 | 141 | 77 | 8 |
| EHN14-TC | M68 | 2-3/4 | 1000 | 100.37 | 6668 | 10.34 | 150 | 78 | 8 |
| EHN15-TC | M76 | 3 | 1200 | 120.44 | 8002 | 12.40 | 162 | 81 | 8 |
| EHN16-TC | M80 | 3-1/4 | 1400 | 140.51 | 9336 | 14.47 | 174 | 87 | 10 |
| EHN17-TC | M90 | 3-1/2 | 1600 | 160.59 | 10669 | 16.54 | 187 | 95 | 10 |
| EHN18-TC | M95 | 3-3/4 | 1700 | 170.62 | 11336 | 17.57 | 194 | 102 | 10 |
| EHN19-TC | M100 | 4 | 1900 | 190.70 | 12670 | 19.64 | 205 | 110 | 10 |
| EHN20-TC | M110 | 4-1/2 | 2200 | 220.81 | 14671 | 22.74 | 223 | 120 | 10 |
| EHN21-TC | M125 | 5 | 2400 | 240.88 | 16004 | 24.81 | 239 | 135 | 15 |
| EHN22-TC | M140 | 5-1/2 | 2900 | 291.06 | 19338 | 29.97 | 261 | 145 | 15 |
| EHN23-TC | M150 | 6 | 3400 | 341.24 | 22673 | 35.14 | 282 | 160 | 15 |

NOTE: EHN#-TC" is not a part number that can be ordered please contact factory for ordering information.

SUBSEA TOOLS

HIGH PERFORMANCE HIGH FORCE HYDRAULICS

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SST...60-61
Subsea Stud Tensioner



Page
SFP...62-65
Subsea Flange Pullers



Page
**SUBSEA
ACCESSORIES...66-67**



OTHER TOOLS FOR SUBSEA

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ENS...48-49
Hydraulic Nut Splitters



Page
TWHC...14-15
High Cycle Torque Wrench



Page
TWLC...24-29
Low Clearance Torque Wrench



OK FOR SUBSEA



SUBSEA TENSIONER

STUD TENSIONER - SST

Bolt coverage from 3/4" to 3-1/2" only 7 tools, SST1 to SST7



Patented Quick Reaction Nut

SST STUD TENSIONER

Quick Reaction Subsea Tensioner

Our Subsea stud tensioner incorporating the quick reaction nut feature reduces diver fatigue, improving diver safety and productivity.

- Visible piston stroke indication
- Positive 'over-stroke' stop to prevent piston expulsion/ seal damage.
- Piston/cylinder misalignment compensation
- Anti-slip cylinder surface for improved handling
- Low friction seals
- Anti-corrosion coating
- Bolt coverage from 3/4" to 4" (M20 to M100)
- Designed to fit BS1560/ANSI B16.5/API flanges, as well as most compact flange designs

Specifications and Dimensional Data

Piston stroke: 30mm except for SST1 - 20mm

Max tool pressure: 21,750 psi (1,500 bar)

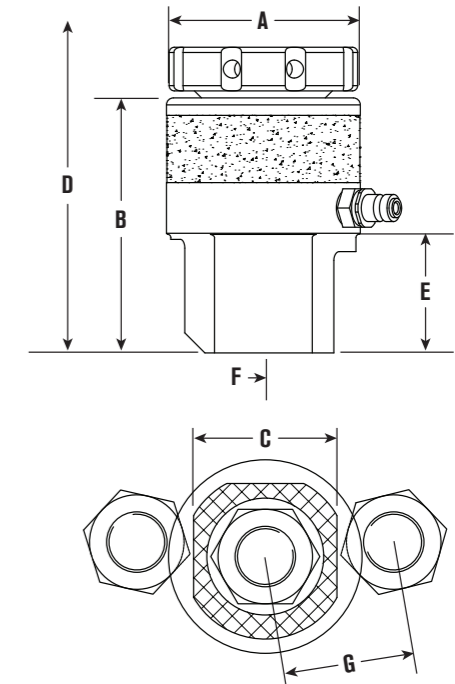
Bolt protrusion above nut: refer to chart below for stud protrusion requirements

'D' includes an allowance for tool removal after bolt tightening with 30mm tool stroke

Product development is constantly taking place and dimensions may change without notice



SST BOLT TENSIONER



Specifications and Dimensional Data

| (Tool Reference) | Stud Diameter | | | | Tool Load | | Hydraulic Area | | Approx. Wt. | | Minimum Bolt Protrusion Above Nut | | | | A | | B | | C | | D | | E | | F | | G | | | | Stud Diameter | | (Tool Reference) | | | |
|------------------|---------------------|----------|-----------------------|--------|-----------|---------|----------------|-----------------|-----------------|-------|-----------------------------------|-------------|-----------|-----------|------|-----|-----|-----|-------|-----|-----|------|-----|------|-----|-----|-------|-----------|------|-----------|---------------|----------|------------------|--------|--------|--------|
| | Load Cell Order No. | Imperial | Adapter Kit Order No. | Metric | Ton | Lbf | kN | in ² | mm ² | lb | kg | Imp bolts | | met bolts | | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | Imp bolts | | met bolts | | Imperial | | Metric | | |
| | | | | | | | | | | | | Order No. | Order No. | in | mm | | | | | | | | | | | | | in | mm | in | mm | | | | in | mm |
| (SST1) | SSTAS010001 | 3/4" | QRNAS010001 | M20 | 15.7 | 31,500 | 140 | 1.45 | 934 | 3.30 | 1.50 | 4.09 | 104 | 4.21 | 107 | 2.6 | 66 | 3.8 | 97 | 1.9 | 48 | 9 | 228 | 9 | 228 | 1.6 | 40 | 0.7 | 19 | 1.7 | 44 | 1.7 | 44 | 3/4" | M20 | (SST1) |
| | | 7/8" | QRNAS010003 | M22 | | | | | | | | QRNAS010005 | 3.98 | 101 | 4.13 | | | | | | | | | | | | | | | 105 | 1.8 | 46 | 1.8 | 45 | 7/8" | M22 |
| (SST2) | SSTAS020001 | 1" | QRNAS020001 | M24 | 27 | 53,900 | 240 | 2.48 | 1,600 | 6.16 | 2.80 | 5.24 | 133 | 5.47 | 139 | 3.2 | 82 | 5 | 127.5 | 2.4 | 60 | 11.7 | 296 | 11.7 | 296 | 2.2 | 56.5 | 1 | 24.5 | 2.2 | 55 | 2.1 | 54 | 1" | M24 | (SST2) |
| | | 1-1/8" | QRNAS020003 | M27 | | | | | | | | QRNAS020005 | 5.12 | 130 | 5.35 | | | | | | | | | | | | | | | 136 | 2.3 | 58 | 2.2 | 56 | 1-1/8" | M27 |
| (SST3) | SSTAS030001 | 1-1/4" | QRNAS030003 | M33 | 43 | 85,400 | 380 | 3.928 | 2,534 | 8.80 | 4 | 5.35 | 136 | 5.59 | 142 | 3.8 | 97 | 5.4 | 137 | 3 | 77 | 12.2 | 309 | 12.2 | 309 | 2.5 | 63 | 1.1 | 28 | 2.7 | 69 | 2.7 | 68 | 1-1/4" | M33 | (SST3) |
| | | 1-3/8" | QRNAS030004 | M36 | | | | | | | | QRNAS030006 | 5.24 | 133 | 5.47 | | | | | | | | | | | | | | | 139 | 2.8 | 72 | 2.8 | 71 | 1-3/8" | M36 |
| (SST4) | SSTAS040001 | 1-1/2" | QRNAS040003 | M39 | 62 | 123,700 | 550 | 5.685 | 3,668 | 13.20 | 6 | 5.51 | 140 | 5.79 | 147 | 4.4 | 111 | 5.7 | 146 | 3.5 | 90 | 12.7 | 322 | 12.7 | 322 | 2.7 | 68 | 1.3 | 33.5 | 3.2 | 81 | 3.2 | 81 | 1-1/2" | M39 | (SST4) |
| | | 1-5/8" | QRNAS040004 | M42 | | | | | | | | QRNAS040006 | 5.35 | 136 | 5.67 | | | | | | | | | | | | | | | 144 | 3.3 | 84 | 3.3 | 84 | 1-5/8" | M42 |
| (SST5) | SSTAS050001 | 1-3/4" | QRNAS050001 | M45 | 99 | 197,800 | 880 | 9.095 | 5,868 | 19.80 | 9 | 5.94 | 151 | 6.3 | 160 | 5.4 | 136 | 6.2 | 158 | 4.5 | 114 | 13.5 | 342 | 13.5 | 342 | 3.1 | 77.5 | 1.6 | 40 | 3.9 | 98 | 3.9 | 98 | 1-3/4" | M45 | (SST5) |
| | | 1-7/8" | QRNAS050003 | M48 | | | | | | | | QRNAS050006 | 5.83 | 148 | 6.22 | | | | | | | | | | | | | | | 158 | 4 | 101 | 4 | 101 | 1-7/8" | M48 |
| (SST6) | SSTAS060001 | 2" | QRNAS050004 | M52 | 175 | 351,000 | 1,560 | 16.137 | 10,411 | 32.34 | 14.7 | 5.71 | 145 | 6.06 | 154 | 7 | 177 | 7.1 | 180.5 | 5.5 | 140 | 14.7 | 374 | 14.7 | 374 | 3.8 | 97 | 2.1 | 53 | 4.1 | 104 | 4.1 | 104 | 2" | M52 | (SST6) |
| | | 2-1/4" | QRNAS060001 | M56 | | | | | | | | QRNAS060005 | 6.54 | 166 | 7.01 | | | | | | | | | | | | | | | 178 | 4.8 | 122 | 4.7 | 120 | 2-1/4" | M56 |
| (SST7) | SSTAS070001 | 2-1/2" | QRNAS060003 | M60 | 289 | 579,000 | 2,575 | 26.623 | 17,176 | 55 | 25 | 6.30 | 160 | 6.89 | 175 | 8.5 | 217 | 8 | 202 | 7.1 | 180 | 16.1 | 409 | 16.1 | 409 | 4.6 | 117.5 | 3.5 | 88 | 5 | 128 | 4.8 | 123 | 2-1/2" | M60 | (SST7) |
| | | 2-3/4" | QRNAS060004 | M64 | | | | | | | | QRNAS060007 | 6.06 | 154 | 6.77 | | | | | | | | | | | | | | | 172 | 5.2 | 133 | 5 | 126 | 2-3/4" | M64 |
| (SST8) | SSTAS080001 | 3" | QRNAS070001 | M76 | 388 | 775,300 | 3,447 | 35.645 | 22,997 | 86.02 | 39.1 | - | - | 6.65 | 169 | 9.8 | 248 | 9.1 | 230 | 8.3 | 210 | 18.9 | 480 | 18.9 | 480 | 5 | 128 | 3.3 | 85 | - | - | 5.1 | 129 | - | M68 | (SST8) |
| | | 3-1/4" | QRNAS070003 | M80 | | | | | | | | QRNAS070006 | 7.13 | 181 | 7.68 | | | | | | | | | | | | | | | 195 | 6.3 | 159 | 6.1 | 155 | 3" | M76 |
| (SST8) | SSTAS080001 | 3-1/2" | QRNAS070004 | M85 | 388 | 775,300 | 3,447 | 35.645 | 22,997 | 86.02 | 39.1 | 6.89 | 175 | 7.56 | 192 | 9.8 | 248 | 9.1 | 230 | 8.3 | 210 | 18.9 | 480 | 18.9 | 480 | 5 | 128 | 3.3 | 85 | 6.5 | 164 | 6.2 | 157 | 3-1/4" | M80 | (SST8) |
| | | 4" | QRNAS080003 | M100 | | | | | | | | QRNAS080005 | 6.65 | 169 | 7.40 | | | | | | | | | | | | | | | 188 | 6.7 | 170 | 6.3 | 160 | 3-1/2" | M85 |
| (SST8) | SSTAS080001 | 3-3/4" | QRNAS080001 | M95 | 388 | 775,300 | 3,447 | 35.645 | 22,997 | 86.02 | 39.1 | - | - | 7.24 | 184 | 9.8 | 248 | 9.1 | 230 | 8.3 | 210 | 18.9 | 480 | 18.9 | 480 | 5 | 128 | 3.3 | 85 | - | - | 6.5 | 166 | - | M90 | (SST8) |
| | | 4" | QRNAS080003 | M100 | | | | | | | | QRNAS080005 | 8.07 | 205 | 8.82 | | | | | | | | | | | | | | | 224 | 7.5 | 190 | 7.2 | 184 | 3-3/4" | M95 |
| (SST8) | SSTAS080001 | 4" | QRNAS080003 | M100 | 388 | 775,300 | 3,447 | 35.645 | 22,997 | 86.02 | 39.1 | 7.83 | 199 | 8.66 | 220 | 9.8 | 248 | 9.1 | 230 | 8.3 | 210 | 18.9 | 480 | 18.9 | 480 | 5 | 128 | 3.3 | 85 | 7.7 | 196 | 7.5 | 190 | 4" | M100 | (SST8) |

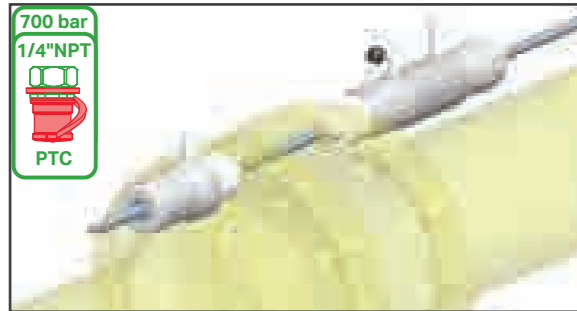
In order to form a complete tensioner, order a load cell (SSTAS0#0001) and an adapter kit (QRNAS0#00##).

| Toggle Bar | Dimensions | Tool Reference | INTTB Order No. |
|------------|--------------|--------------------------------------|-----------------|
| | 6mm x 200mm | SST1, SST2 | INTTB000006 |
| | 8mm x 200mm | SST3 | INTTB000008 |
| | 10mm x 200mm | SST4, SST5 (up to 1-7/8" - M48) | INTTB000010 |
| | 12mm x 200mm | SST5 (2" - M52), SST6 (2-1/4" - M56) | INTTB000012 |
| | 14mm x 200mm | SST6 (2-1/2" - M60 and above) | INTTB000014 |
| | 16mm x 250mm | SST7, SST8 | INTTB000016 |

FLANGE PULLERS

SUBSEA - SFP

700 bar/10,000 psi



WIRE ROPE FLANGE PULLING SYSTEM

- Compact design
- Long Piston Stroke - 102mm (4")
- Self activating collet design
- Auto grab Anchor Collet with hydraulic release
- Manually releaseable Retract Collet prevents lock on
- High strength, low rotation wire rope
- Anti-Slip surfaces
- Operated via separate diver control valve providing precise control for up to 4 pullers

THREADED BAR FLANGE PULLING SYSTEM

- Compact design
- Long Piston Stroke - 102mm (4")
- 700 bar (10,000 psi) systems
- Rapid assembly using Quick Release Reaction Nuts
- High strength threaded bar
- Anti-Slip surfaces
- Operated via separate diver control valve providing precise control for up to 4 pullers

FEATURES

Compact Design

Designed to fit ANSI B16.5, MSS SP44, API 6A and most other flange applications dedicated flange hole adaptors.

Hydraulic Anchor Collet Release

Anchor collet automatically grips wire rope (without hydraulic pressure). Collets can be fully released by applying hydraulic pressure.

Auto Advance Collet Release

Advance collet fully disengages when the pulling cylinder is fully retracted

Manual Retract Collet Release

Retract collet can be manually disengaged, allowing the pulling cylinder (including Advance and Retrace collets) to be removed from the wire rope while the rope is installed in the flanges. Also allows the pulling system to be removed when pipe spring is evident (pipe spring makes the Anchor collet difficult to release).

Low Rotation Wire Rope

Special high load, 19mm and 22mm low rotation, steel wire rope ensure effective collet grip and reduces bird caging effects and strand unwinding.

Remote Diver Control Valve

Pulling Cylinders are controlled via a separate Valve Control Console allowing the diver to control the pullers remote from the work site. This eliminates bulky cylinder mounted control valves and negates constant diver intervention between pullers when advancing and retracting the cylinders.

Drawbar System Conversion with Quick Release Nuts

Pulling Cylinders can be simply converted to use a 1-1/8" threaded drawbar instead of wire ropes. The system utilizes Quick Release Reaction nuts for speed and versatility.

Flexible Design

Two or more cylinders can be linked together to cater for larger flange sizes/loads.

Specifications and Dimensional Data

Max capacity of cylinder: 20.0 tonf (199.3 kN)

Max operating pressure of cylinder: 10,000 psi (700 bar)

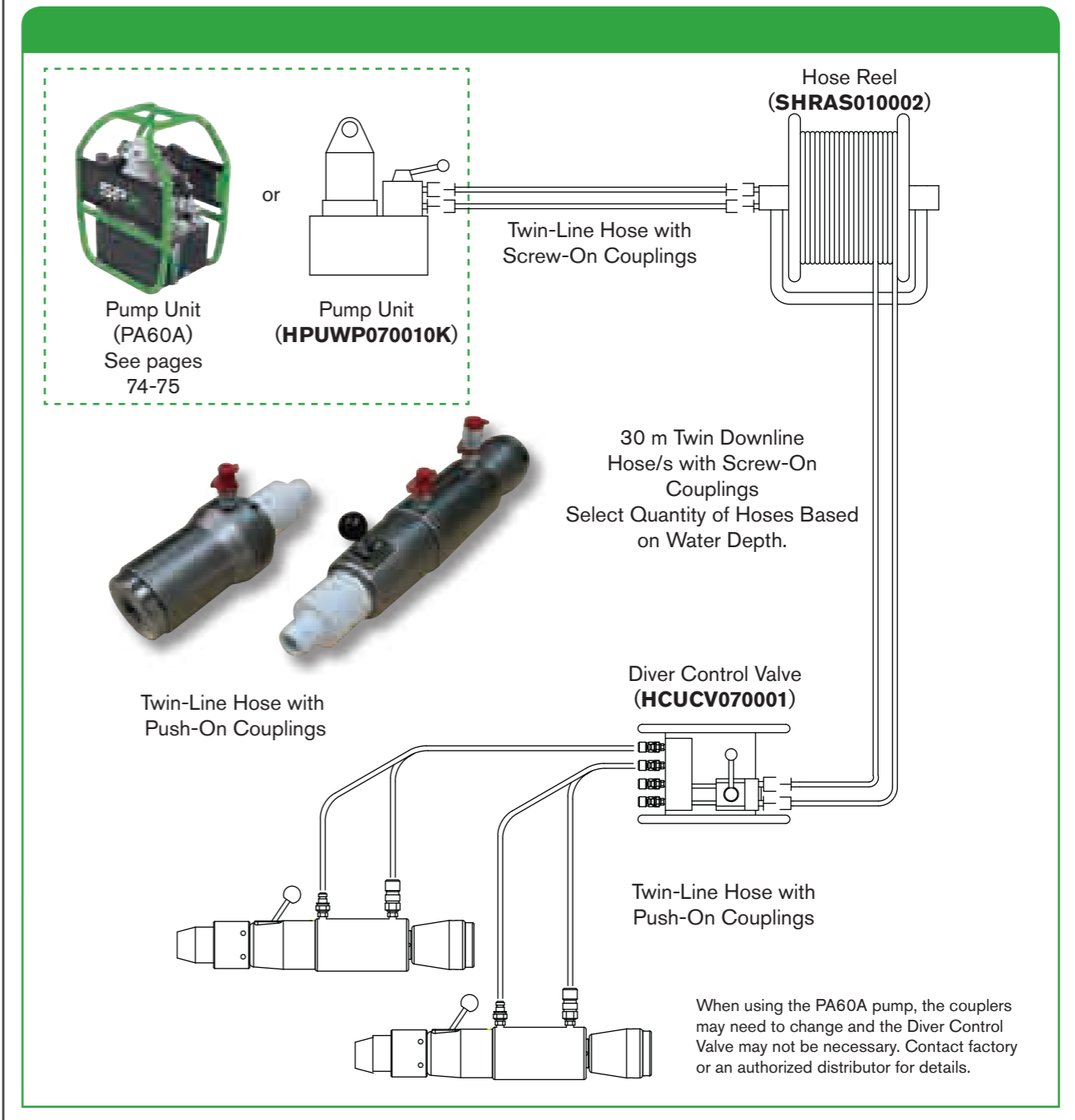
Max stroke of cylinder: 4.0" (102 mm)

Diameter of wire ropes/drawbar available: 19.0mm, 22.0mm, 1-1/8" 8UN Drawbar

Specified minimum breaking load of rope: 19.0mm - 307 kN (30.8 tonf), 22mm - 415 kN (41.6 tonf)

System operating pressure with 19.0/22.0 mm rope: 5,000 psi (345 bar)

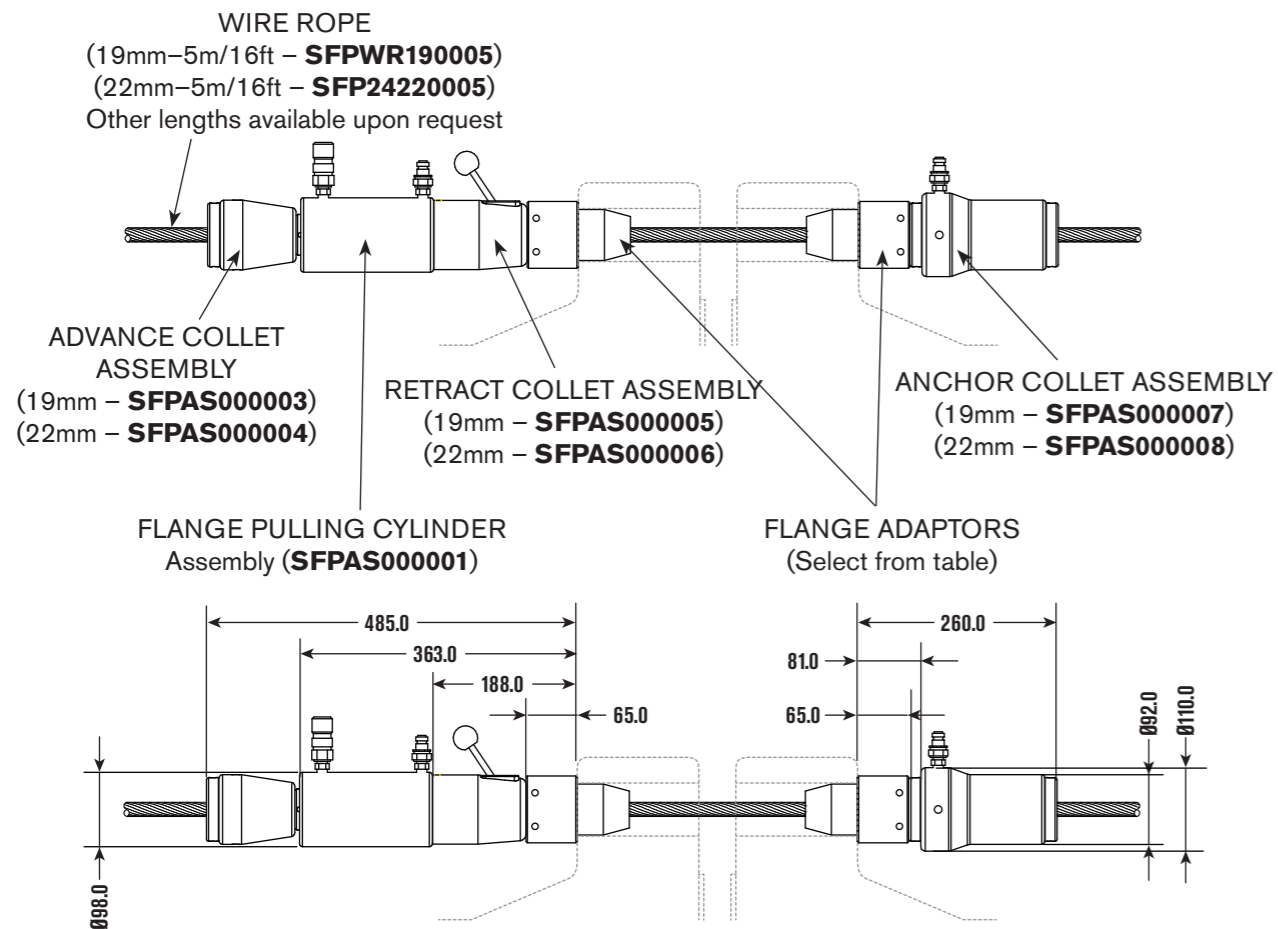
System operating pressure with 1-1/8" drawbar (Gr B7): 10,000 psi (690 bar)



FLANGE PULLERS SUBSEA - SFP

WIRE ROPE FLANGE PULLING SYSTEM

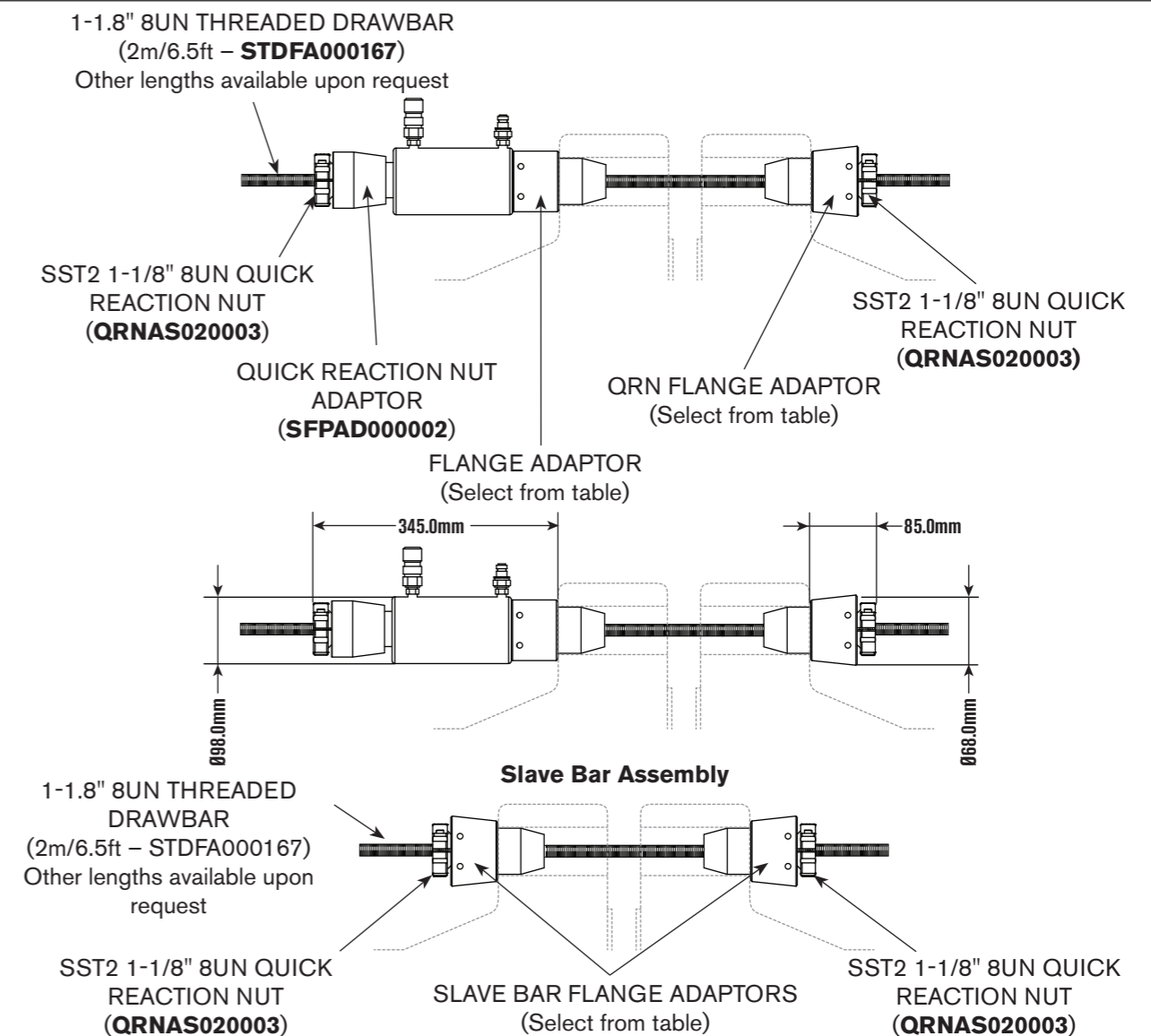
Specifications and Dimensional Data



| For Bolt Diameter | | For Flange Hole Diameter | | Wire Rope Flange Adapter Order No. |
|-------------------|---------|--------------------------|-------|------------------------------------|
| in | mm | in | mm | |
| 3/4 | M20 | 7/8 | 22.2 | SFPWA000C00 |
| 7/8 | M24 | 1 | 25.4 | SFPWA000D00 |
| 1 | M27 | 1-1/8 | 28.6 | SFPWA000E00 |
| 1-1/8 | M30 | 1-1/4 | 31.8 | SFPWA000F00 |
| 1-1/4 | M33 | 1-3/8 | 34.9 | SFPWA000G00 |
| 1-3/8 | M36 | 1-1/2 | 38.1 | SFPWA000H00 |
| 1-1/2 | M39 | 1-5/8 | 41.3 | SFPWA000I00 |
| 1-5/8 | M42 | 1-3/4 | 44.5 | SFPWA000J00 |
| 1-3/4 | M45 | 1-7/8 | 47.6 | SFPWA000K00 |
| 1-7/8 | M48 | 2 | 50.8 | SFPWA000L00 |
| 2 | M52 | 2-1/8 | 54 | SFPWA000M00 |
| 2-1/4 | M56 | 2-3/8 | 60.3 | SFPWA000N00 |
| 2-1/2 | M64 | 2-5/8 | 66.7 | SFPWA000P00 |
| 2-3/4 | M68/M70 | 2-7/8 | 73 | SFPWA000Q00 |
| 3 | M76 | 3-1/8 | 79.4 | SFPWA000R00 |
| 3-1/4 | M82 | 3-3/8 | 85.7 | SFPWA000S00 |
| 3-1/2 | M90 | 3-5/8 | 92.1 | SFPWA000T00 |
| 3-3/4 | M95 | 3-7/8 | 98.4 | SFPWA000U00 |
| 4 | M100 | 4-1/8 | 104.8 | SFPWA000V00 |

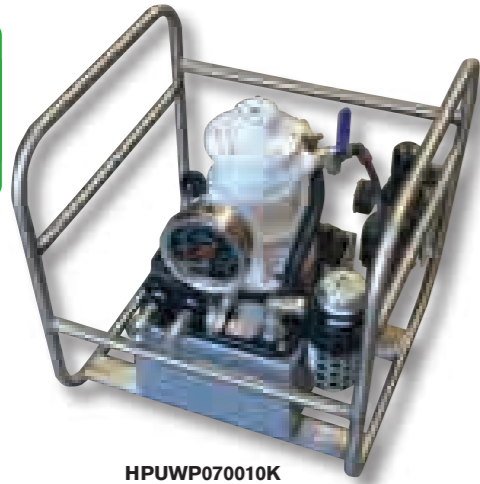
THREADED BAR FLANGE PULLING SYSTEM

Specifications and Dimensional Data



| For Bolt Diameter | | For Flange Hole Diameter | | Threaded Drawbar Flange Adapter | | |
|-------------------|---------|--------------------------|-------|---------------------------------|--------------------|--------------------------|
| in | mm | in | mm | Flange Adapter | QRN Flange Adapter | Slave Bar Flange Adapter |
| 1-1/4 | M33 | 1-3/8 | 34.9 | SFPTA000H00 | SFPQA000H00 | SFPSA000H00 |
| 1-3/8 | M36 | 1-1/2 | 38.1 | SFPTA000I00 | SFPQA000I00 | SFPSA000K00 |
| 1-1/2 | M39 | 1-5/8 | 41.3 | | | |
| 1-5/8 | M42 | 1-3/4 | 44.5 | SFPTA000J00 | SFPQA000J00 | SFPSA000K00 |
| 1-3/4 | M45 | 1-7/8 | 47.6 | SFPTA000K00 | SFPQA000K00 | SFPSA000M00 |
| 1-7/8 | M48 | 2 | 50.8 | SFPTA000L00 | SFPQA000L00 | |
| 2 | M52 | 2-1/8 | 54 | SFPTA000M00 | SFPQA000M00 | SFPSA000M00 |
| 2-1/4 | M56 | 2-3/8 | 60.3 | SFPTA000N00 | SFPQA000N00 | SFPSA000Q00 |
| 2-1/2 | M64 | 2-5/8 | 66.7 | SFPTA000P00 | SFPQA000P00 | |
| 2-3/4 | M68/M70 | 2-7/8 | 73 | SFPTA000Q00 | SFPQA000Q00 | SFPSA000Q00 |
| 3 | M76 | 3-1/8 | 79.4 | SFPTA000R00 | SFPQA000R00 | SFPSA000T00 |
| 3-1/4 | M82 | 3-3/8 | 85.7 | SFPTA000S00 | SFPQA000S00 | |
| 3-1/2 | M90 | 3-5/8 | 92.1 | SFPTA000T00 | SFPQA000T00 | SFPSA000T00 |
| 3-3/4 | M95 | 3-7/8 | 98.4 | SFPTA000U00 | SFPQA000U00 | SFPSA000V00 |
| 4 | M100 | 4-1/8 | 104.8 | SFPTA000V00 | SFPQA000V00 | |

SUBSEA ACCESSORIES



HPUWP070010K

HIGH FLOW PUMP

Typical use: Flange Pullers, Torque Wrenches, Nutsplitters

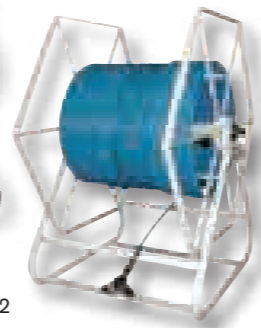
- Self priming, 2-speed operation
- 2.24 kw (3 hp) Air motor (50 CFM)
- 700 bar (10,000 psi) maximum pressure
- Calibratable 100mm (4") pressure gauge
- Adjustable pressure relief valve
- Flow rate up to 11.8 litres/min (720 cu. in/min)
- Internal oil cooler
- Low noise operation
- Pneumatic Filter/Regulator/Lubricator
- 9.5 Litre (2 gal.) Reservoir (optional oil level gauge)
- Carrying frame (WxLxH): 430 x 460 x 460 (mm)
- Weight: 40 Kg (88 lb) (inc. oil)
- Alternate Pump: PA60A can be used as an alternate to the **HPUW070010K** shown. See page 74 for details.

SINGLE & TWIN-LINE HOSE REELS

- Hose reels available for tension and torque applications
- -30°C to 80°C working temperature range
- Female quick connect couplings as standard
- Hose Reel Dimensions (WxLxH): 750 x 1,000 x 1,050 (mm), 29" x 39" x 41"
- Hose Reel Weight: 65 Kg (145 lb) (without hose)



See page 102



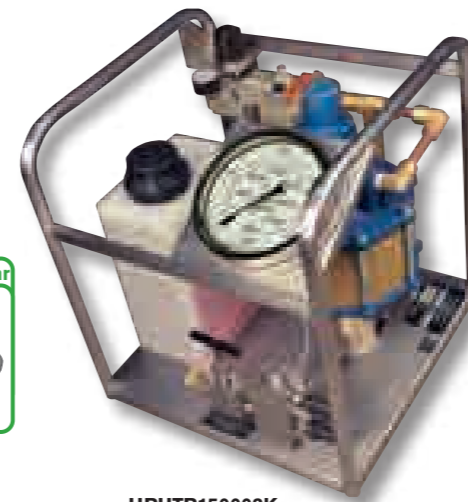
REMOTE DIVER CONTROL VALVE

Gives diver precise control of Flange Pullers, Torque Wrenches, Nutsplitters, Jack, Cylinders, etc.

- 700 bar (10,000 psi) maximum working pressure
- Allows connection of up to 4 tools
- Stainless steel construction (rust free)
- Internal relief valve controls retract pressure
- Couplers on reel side are flat face for easy connection under water. Couplers on valve side match the required tool.
- Dimensions (WxLxH): 420 x 270 x 200 (mm)
- Weight: 9 kg (19.8 lb)



HCUCV070001



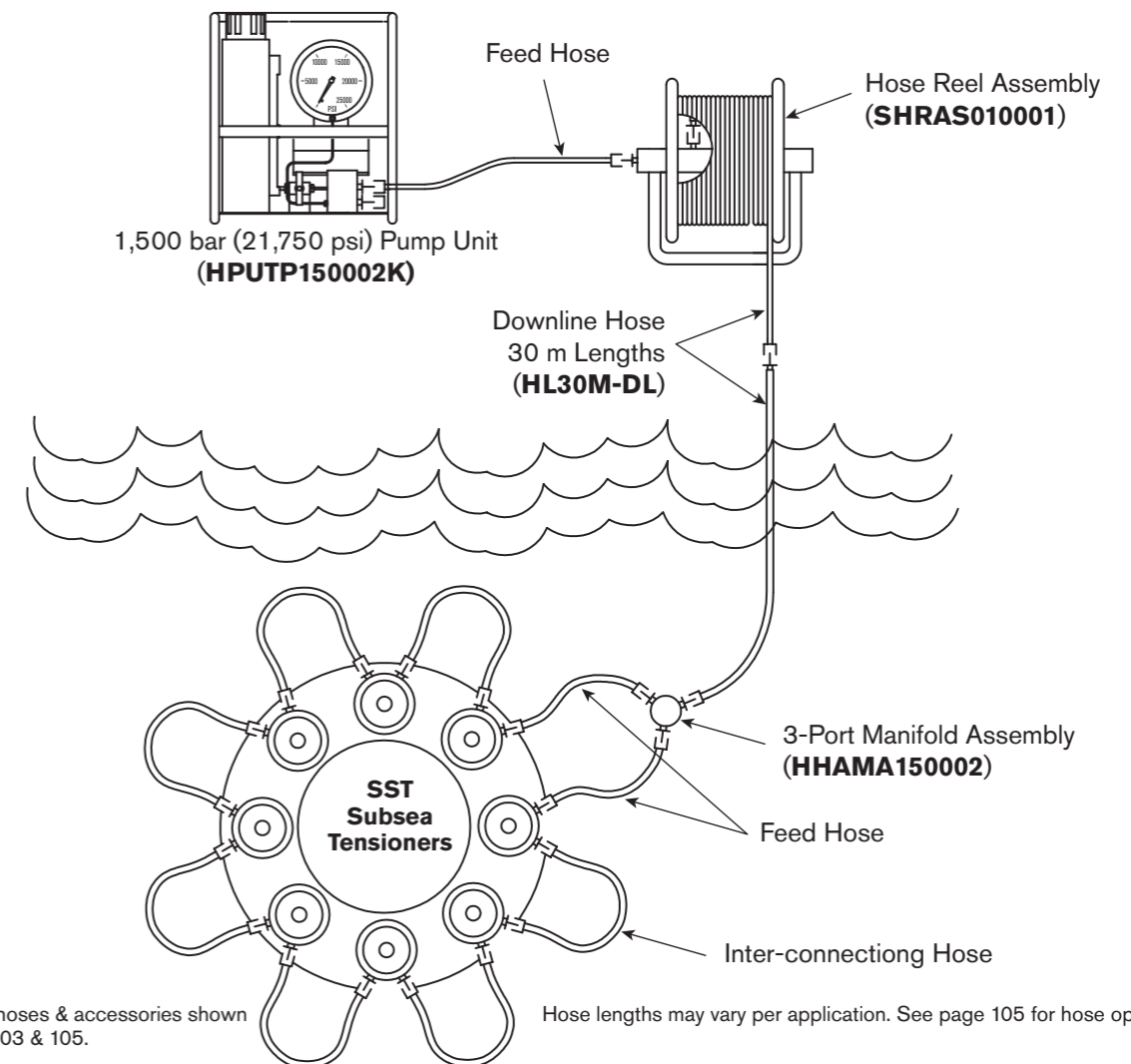
HPUTP150002K
See pages 94-97

HIGH FLOW BOLT-TENSIONING PUMP

Typical use: Subsea Bolt Tensioners, Segmented Tensioners

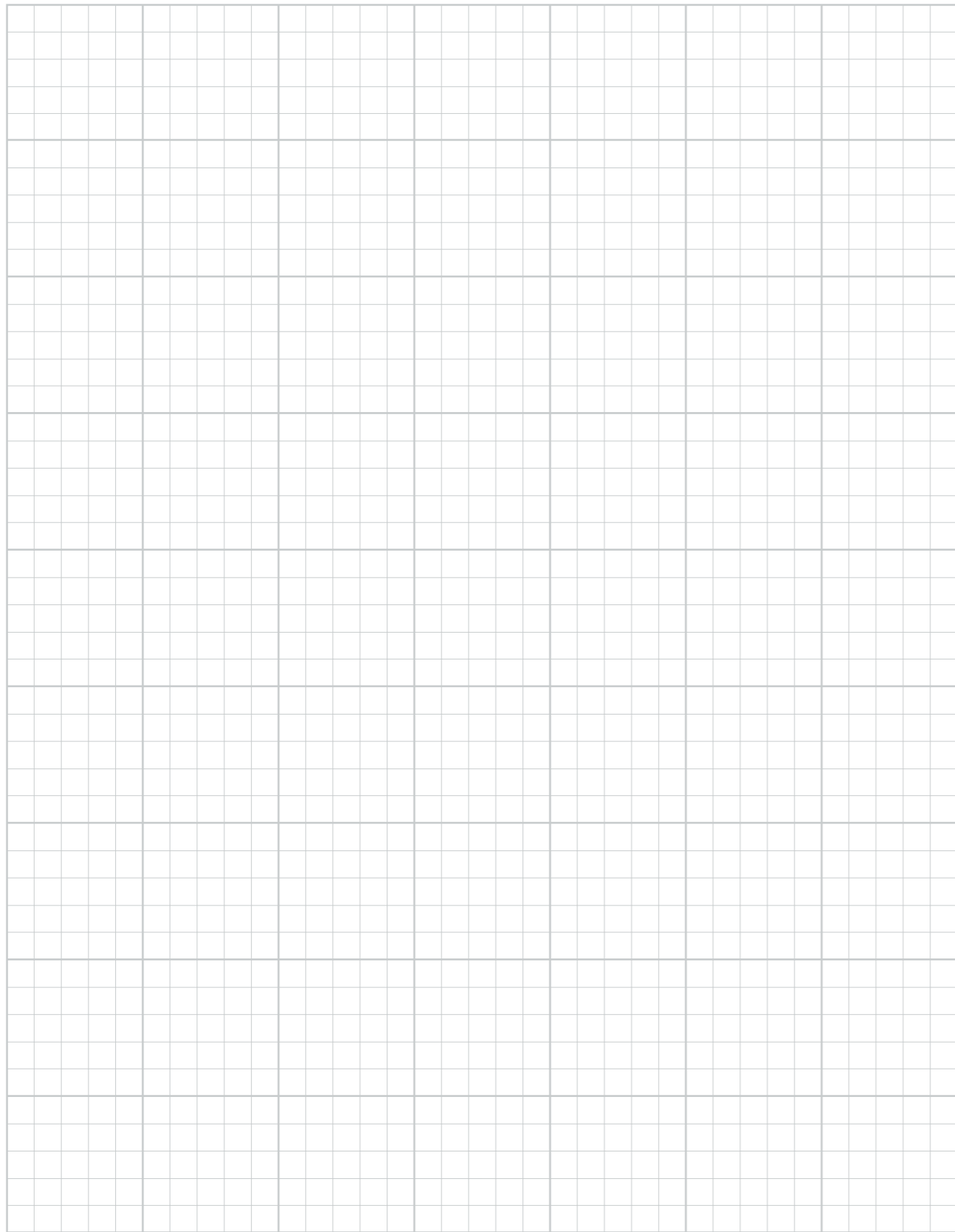
- 1,500 bar (21,750 psi) maximum working pressure (restricted)
- Calibrated 150mm (6") pressure gauge
- Flow rate up to 1.14 litres/min (70 cu. in/min)
- Dual oil outlets with quick-connect no spill couplings
- Pneumatic Filter/Regulator/Lubricator
- 9.5 Litre (2 gal.) polyethylene reservoir
- Dimensions (WxLxH): 465 x 530 x 515 (mm), 18" x 20" x 20"
- Approx. Weight: 23 Kg (51 lb)

OFFSHORE PUMP & HOSE ARRANGEMENT FOR SST SUBSEA TENSIONERS



1,500 bar hoses & accessories shown on pages 103 & 105.

Hose lengths may vary per application. See page 105 for hose options.



PUMPS

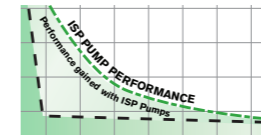
FOR TORQUE WRENCHES, NUT SPLITTERS & SPREADERS

700 BAR (10,000 PSI) - HIGH PERFORMANCE HYDRAULIC PUMPS

Page
**BOLTING PUMP
SUMMARY
CHART...70**

| | Torque Wrench | | Nut Splitter | | Spreader | |
|------------|---------------|-----------|--------------|-----------|-----------|-----------|
| | 10000 PSI | 15000 PSI | 10000 PSI | 15000 PSI | 10000 PSI | 15000 PSI |
| PE45 | X | X | X | X | X | X |
| PA60A | X | X | X | X | X | X |
| PE39 | X | X | X | X | X | X |
| PE55TWP-BS | X | X | X | X | X | X |
| PE45 | X | X | X | X | X | X |
| PA60A | X | X | X | X | X | X |
| PE39 | X | X | X | X | X | X |
| PE55TWP-BS | X | X | X | X | X | X |

Page
**ISP
ADVANTAGE...71**



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Infinity Series Electric Pump



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PA60A...74-75
Infinity Series Air Pump



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Compact Torque Wrench Pump



Page
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Classic Series Electric
Hydraulic Pump



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Legacy Series Electric
Hydraulic Pump



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Gas Powered Pump



Page
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Classic Series Air
Hydraulic Pump



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X1A1-PT...86-87
Legacy Series Air
Hydraulic Pump



Page
P SERIES...88-89
Hand Pumps
700 bar (10,000 psi)



BOLTING PUMP SUMMARY CHART

Most customers choose to use hand pumps for spreading and nutsplitting applications because of their ability to spread and hold. When using spreaders with torque wrench pumps, use only the top port advance and know that the spreader will retract when the pump is turned off.

Bold Products have higher stocking levels. X

| | | Torque or Split | | | | | | | | Tension | | | |
|---|---|-----------------|------|------------|---------|----------|-------|----------|------------|---------|-----|---------|---------|
| | | PE39 | PE45 | PE55TWP-BS | X1E#-PT | PG120TWP | PA60A | RWP55-BS | RWP55-Dual | X1A1-PT | PE8 | HPUTP-1 | HPUTP-2 |
| POWER SOURCE | ELECTRIC (110/115V) | X | X | X | X | | | | | | X | | |
| | ELECTRIC (220/230V) | X | X | X | X | | | | | | X | | |
| | AIR | | | | | X | X | X | X | | | X | X |
| ELECTRIC MOTOR TYPE | GAS | | | | X | | | | | | | | |
| | UNIVERSAL | X | X | X | X | n/a | | | | | X | | |
| MAX PRESSURE | INDUCTION | | | | n/a | | | | | | | | |
| | 10,000 PSI (700 BAR) | X | X | X | X | X | X | X | X | | | | |
| PUMP TYPE | 21,750 PSI (1,500 BAR) | | | | | | | | | | X | X | X |
| | TWO-STAGE | X | | X | X | X | X | X | X | X | | | |
| FLOW RATE @MAX PRESSURE | INFINITE STAGE (ISP) | | X | | | X | | | | | | | |
| | LOW (<20 IN ³ /MIN, <0.33 L/min) | | | | | | | | | | X | | |
| | MED. (<40 IN ³ /MIN, <0.66 L/min) | X | | | | | | | | | | | |
| | HIGH (<60 IN ³ /MIN, <0.98 L/min) | | X | X | X | | X | X | | X | | X | |
| SPEED @MAX PRESSURE | VERY HIGH (>60 IN ³ /MIN, >0.98 L/min) | | | | X | | | X | | | | | X |
| | SLOW | X | | | | | | | | X | | | |
| | MED | | X | X | | | X | X | X | | X | | |
| APPLICATION TYPE | FAST | | X | X | X | X | X | X | | | | | X |
| | ORIGINAL INSTALL | | X | X | X | X | X | X | X | X | X | X | X |
| DUTY CYCLE | OPERATIONS/MRO/SERVICE | X | | X | X | | X | X | X | X | X | X | X |
| | CONTINUOUS | | X | X | X | X | X | X | X | X | X | X | X |
| # OF PORTS (TOOL QUANTITY) | INTERMITTENT | X | | X | X | | X | X | X | X | X | X | X |
| | 1 | X | X | X | X | X | X | X | X | X | | | |
| | 2 | | X | X | | | X | X | X | | X | X | X |
| OIL TANK CAPACITY | 4 | | | | | X | X | X | | | | | |
| | 0.5 GAL (1.9 L) | X | | | | | | | | | | | |
| | 1.0 GAL (3.8 L) | | | | | | | | | | X | | |
| | 1.25 GAL (4.7 L) | | | | | | | | | | | | |
| | 1.5 GAL (5.7 L) | | X | | | | | | | | | | |
| | 2.0 GAL (7.6 L) | | | | | X | | | | | | | |
| 2.5 GAL (9.4 L) | | | X | X | | X | | X | | X | X | | |
| SPECIAL CONSIDERATIONS/ LOCATIONS/ APPLICATIONS * | 3.0 Gal (11.3 L) | | | | X | | | | | | | | |
| | 5.0 Gal (18.9 L) | | | | | | X | | | | | | |
| | SUBSEA (UNDERWATER) | | | | | | | | | | | | X |
| | WIND/UP-TOWER, TIGHT SPACE | X | | | | | | | | | X | | |
| | WIND/FOUNDATION TENSION | | | | | | | | | | X | X | X |
| | ATEX II 2 GDC T4 | | | | | X | X | | | | | | |
| | CE | X | X | | X | X | X | | | | X | X | X |
| AUTO CYCLE | | X | | | | | | | | | | | |
| PENDANT INCLUDED | X | X | X | X | X | X | X | X | X | X | | | |
| OPTIONAL COOLER AVAILABLE | X | X | | | | X | | | | | | | |

Virtually any pump may be used for Original Installation or Service. This chart factors pump cost and usage together to determine a total cost of ownership and recommends a pump based upon value delivered.

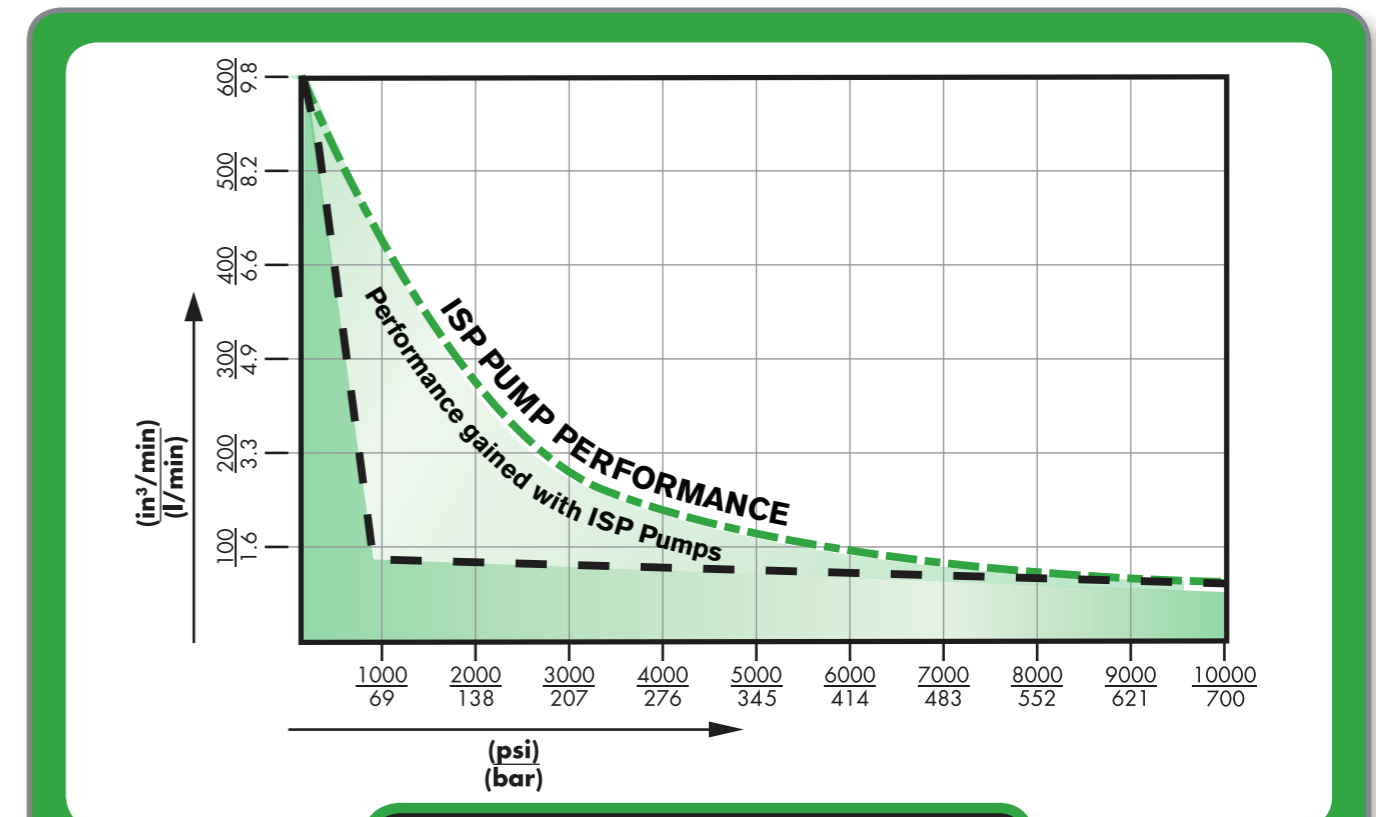
* Please contact factory of authorized reseller with questions about special applications.

Pumps designed for torque wrench applications do not hold pressure, they should NOT be used for lifting applications and should be used with caution for spreading applications.

THE ISP ADVANTAGE: INCREASED PRODUCTIVITY

The Infinity Stage Pump (ISP) from SPX helps get work done faster. The innovative, patent pending design takes advantage of a continuously variable output that provides maximum flow within the rated pressure range of the pump - from 0 - 700 bar (0 to 10,000 psi). Most torquing and spreading work is done between 70 - 400 bar (1,000 - 6,000 psi), which is where the Infinity Stage Pumps (ISP) provide the most significant advantage over traditional pumps. For example, at 70 bar (1,000 psi) there is 5X as much flow as a traditional two-stage pump. At 275 bar (4,000 psi) there is 2X as much flow as a traditional pump.

The additional flow moves tools faster which allows work to be done quicker and more efficiently. The increased efficiency saves you time - allowing you to get onto your next job sooner and more profitably.



FEATURED ON



INFINITY SERIES ELECTRIC PUMP

PE45
700 bar/10,000 psi



700 BAR (10,000 PSI) INFINITY SERIES (ISP) ELECTRIC PUMP

The PE45 is an Infinite Stage Electric Pump which increases productivity on the job by providing continuous pressure for up to 2x the speed of typical 2-stage pumps. Jobs get done faster and easier.

Quality means Lower Life-Cycle Costs:

- Over 100,000 cycles
- Continuous duty up to 50°C (122°F) ambient
- Proven design = Proven reliability

Enhanced Usability:

- Light Weight: 32.2 kg (71 lb) [without oil]
- Removable control pendant (5 m/15 ft)
- Removable 100mm (4"), calibration-capable gauge
- Universal Motor for reduced voltage applications (up to -20% nominal voltage)
- 4 tool manifold available powers up to 4 tools from a single pump (not for lifting applications)
- High flow to get work done faster

Designed with Safety in Mind:

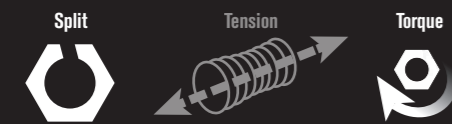
- Easily adjusted pressure regulator (relief) valve
- Fixed 103 bar (1,500 psi) retract relief valve pressure



DESIGNED FOR



MAINTENANCE & REPAIR ORIGINAL INSTALL



Specifications and Dimensional Data

Size (L x W x H): 45 cm x 35.6 cm x 67.5 cm
17.7" x 14.0" x 26.6"

Weight: 32.2 kg (71 lb) [without oil]

Maximum Oil Capacity: (vented reservoir)
6.75 L (1.5 Gallons) [to fill line]
5.1 L (1.12 Gallons) [usable]

Operating Environment:
-25°C to +50°C (-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manual and cooling option)

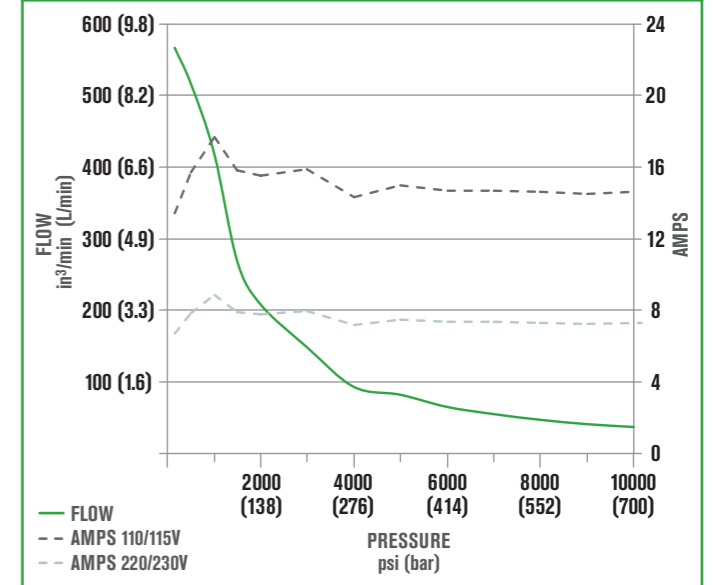
Sound Level: 87-92 dBA (max)
Pressure: 0 - 700 bar (0 - 10,000 psi)

Typical Flow: 9.4 L/min - 0.8 L/min
(575 in³/min - 48 in³/min)

Power: 1.8 hp Universal Motor
110/115V - 50/60 Hz (17 amps)
220/230V - 50/60 Hz (8.5 amps)

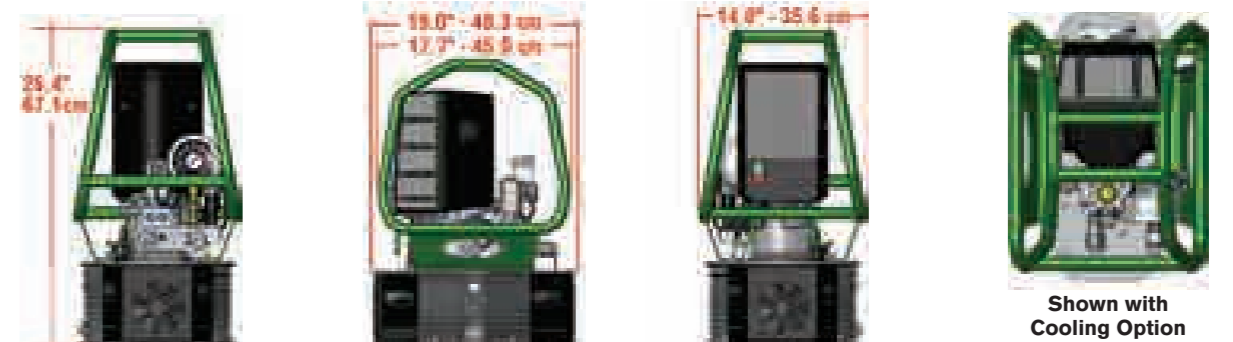


Typical Flow Curve



OPTIONS:

- Oil Cooling System
- 4-Port manifold
- 115V grounded plug pre-installed



Ordering Information

PE 45 EE 4 PRS

Power Source

Y = 110/115 VAC w/plug
L = 110/115 VAC w/flying leads (not stocked)
P = 220/230 VAC w/flying leads

Auto Cycle

Blank = No Auto Cycle
A = w/Auto Cycle

Cooling

Blank = w/o cooling
C = w/cooling

- Ports

Blank = 1 port (1 tool)
M = 4 ports (4 tools)

Example: PE45YEE4ACMPRS

PE45 Electric Pump with 110/115 VAC Motor with cord with typical grounded 3 prong plug, with Auto Cycle Feature, with active Cooling reservoir and with 4 ports.

INFINITY SERIES AIR PUMP

PA60A

700 bar/10,000 psi



700 BAR (10,000 PSI) INFINITY SERIES (ISP) AIR PUMP

The PA60A is an Infinity Stage Air Pump which increases productivity on the job by providing continuous pressure for up to 2x the speed of typical 2-stage pumps. Jobs get done faster and easier.

Quality means Lower Life-Cycle Costs:

- Over 100,000 cycles
- Continuous duty up to 50°C (122°F) ambient
- Proven design = Proven reliability

Enhanced Usability:

- Light weight and portable: 34.9 kg (77 lb) [without oil] PA60APF5FP
- Light weight and portable: 40.1 kg (88 lb) [without oil] PA60APF5FMPR
- Removable control pendant (7.6 m/ 25 ft)
- Removable 100 mm (4"), calibration-capable gauge
- **CE**
- ATEX **Ex** II 2 GDc T4
- 4 port manifold available to power up to 4 tools from a single pump (not for lifting applications)
- Fewer parts for lower service cost

Designed with Safety in Mind:

- Easily adjusted pressure regulator (relief valve)
- Fixed 103 bar (1,500 psi) retract relief valve pressure

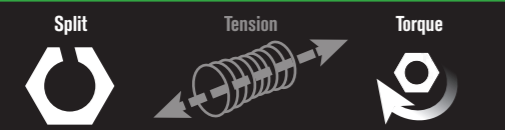


DESIGNED FOR



MAINTENANCE
& REPAIR

ORIGINAL
INSTALL



Max
Flow



Specifications and Dimensional Data

Size (L x W x H): 50 cm x 36 cm x 51 cm
19.6" x 14.0" x 20.2" (PA60APF5FMP)

Size (L x W x H): 47 cm x 30 cm x 53 cm
18.6" x 11.8" x 21.0" (PA60APF5FMPR)

Weight:

34.9 kg (76.9 lb) [without oil] PA60APF5FP
36.9 kg (81.5 lb) [without oil] PA60APF5FMP
37.9 kg (83.7 lb) [without oil] PA60APF5FPR
40.0 kg (88.3 lb) [without oil] PA60APF5FMPR

Maximum Oil Capacity:

(vented reservoir)
8.5 L (2.2 Gallons) [to fill line]
7.0 L (1.8 Gallons) [usable]

Operating Environment:

-25°C to +50°C (-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

Sound Level:

76 dBA (max)
Pressure: 0 - 700 bar (0 - 10,000 psi)

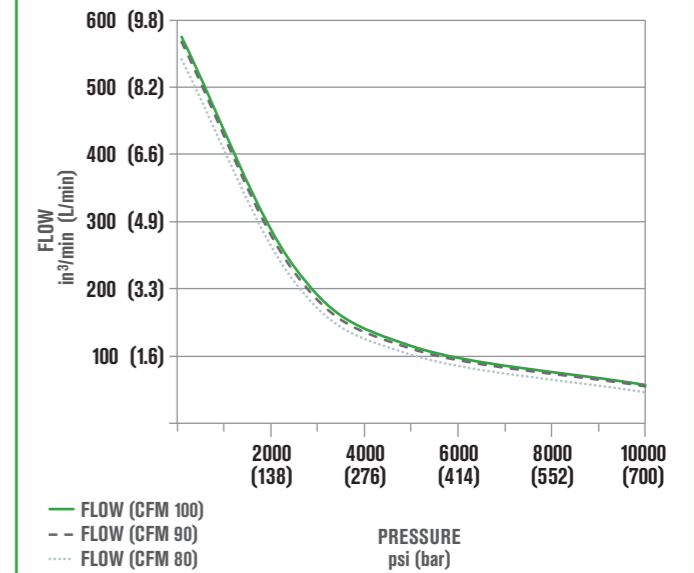
Typical Flow: 9.4 L/min - 0.8 L/min
(575 in³/min - 48 in³/min)

Air: 2.3 m³/min @ 5.5 bar (80 cfm @ 80 psi)
2.5 m³/min @ 6.2 bar (90 cfm @ 90 psi)
2.8 m³/min @ 6.9 bar (100 cfm @ 100 psi)

* Values shown are with filter/regulator/lubricator.
Values will increase without filter/regulator/
lubricator.

CE

Typical Flow Curve



Hydraulic Oil Delivery

| | @ 100 cfm | @ 90 cfm | @ 80 cfm |
|-----------------------|---|---|---|
| 750 psi 51 bar | 575 in ³ /min (9.4 L/min) | 567 in ³ /min (9.3 L/min) | 541 in ³ /min (8.9 L/min) |
| 2,500 psi 175 bar | 233 in ³ /min (3.8 L/min) | 225 in ³ /min (3.7 L/min) | 211 in ³ /min (3.4 L/min) |
| 5,000 psi 350 bar | 115 in ³ /min (1.9 L/min) | 111 in ³ /min (1.8 L/min) | 102 in ³ /min (1.7 L/min) |
| 10,000 psi 700 bar | 57 in ³ /min (0.9 L/min) | 55 in ³ /min (0.9 L/min) | 46 in ³ /min (0.8 L/min) |

Ordering Information

| Order No. | Description |
|--------------|---|
| PA60APF5FMP | PUMP, ISP 60 CU-IN/MIN, AIR/HYD, 4-PORT |
| PA60APF5FMPR | PUMP, ISP 60 CU-IN/MIN, AIR/HYD 4-PORT, Roll Cage |
| PA60APF5FP | PUMP, ISP 60 CU-IN/MIN, AIR/HYD |
| PA60APF5FPR | PUMP, ISP 60 CU-IN/MIN, AIR/HYD, Roll Cage |

COMPACT ELECTRIC TORQUE WRENCH PUMP

PE39

700 bar/10,000 psi



700 BAR (10,000 PSI) COMPACT ELECTRIC TORQUE WRENCH PUMP

The PE39 is compact and capable of being used in a vertical or horizontal orientation. Based on proven pump design for reliability in rugged torque wrench applications to support operation and maintenance requirements.

Quality means Lower Life-Cycle Costs:

- Over 100,000 cycles
- Continuous duty up to 50°C (122°F) ambient
- Proven design = proven reliability

Enhanced Usability:

- Light weight and portable: 17.7 kg (39 lb)
- Removable control pendant (5 m/15 ft cord length)
- Removable 100 mm (4") calibration-capable gauge
- Universal Motor for reduced voltage applications (up to -20% nominal voltage)
- Vertical or horizontal operation
- Easy install cooling fan as option

Designed with Safety in Mind:

- Easily adjusted pressure regulator (relief) valve
- Fixed 103 bar (1,500 psi) retract relief valve pressure

Specifications and Dimensional Data

Size (L x W x H): 35 cm x 27.4 cm x 60 cm
13.8" x 10.8" x 23.7"

Weight: 17.7 kg (39 lb) [without Oil]

Maximum Oil Capacity: (non-vented reservoir)
1.9 L (0.5 Gallons) [to fill line]
1.5 L (0.4 Gallons) [usable]

Operating Environment: -25°C to +50°C
(-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

Sound Level: 87 – 92 dBA (max)

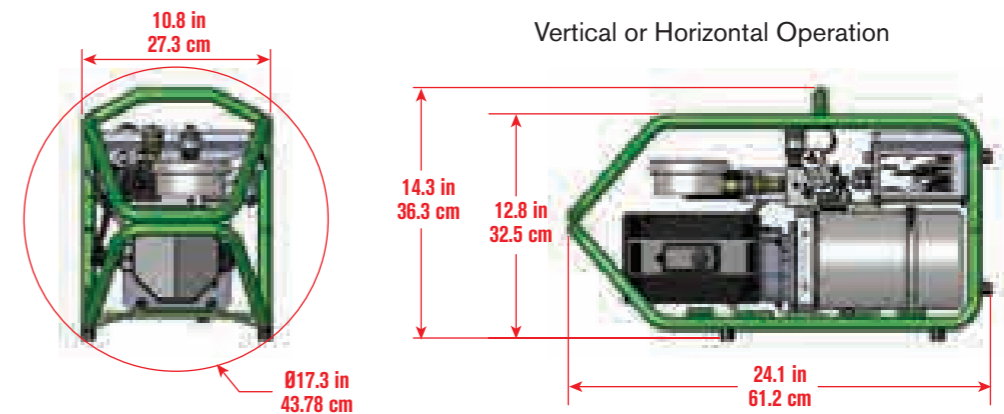
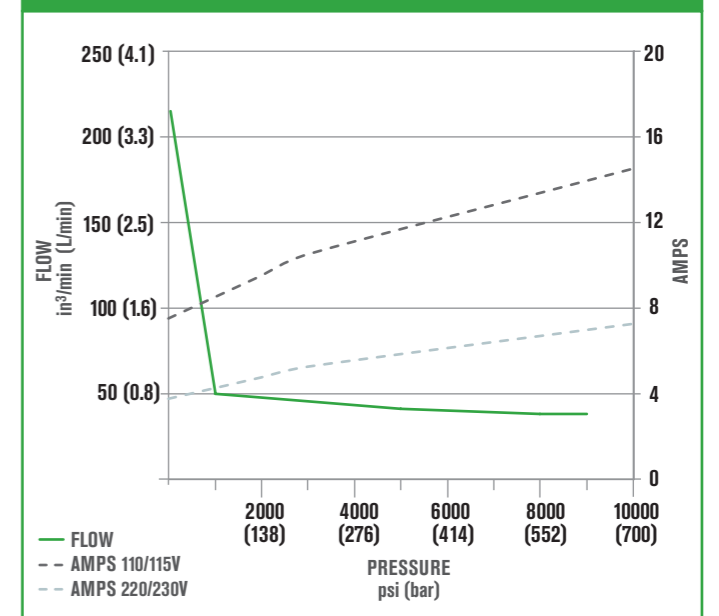
Pressure: 0 - 700 bar (0 - 10,000 psi)

Typical Flow: 3.7 L/min - 0.64 L/min
(225 in³/min - 39 in³/min)

Power: 1.3 hp Universal Motor
110/115V - 50/60 Hz (14.5 amps)
220/230V - 50/60 Hz (7.2 amps)



Typical Flow Curve

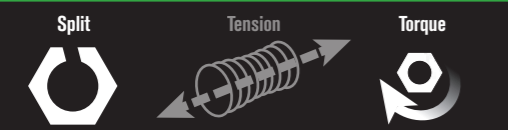


To be used with torque wrenches, pages 10-31

DESIGNED FOR



MAINTENANCE & REPAIR ORIGINAL INSTALL



Ordering Information

| Order No. | Description |
|-------------|--------------------------------|
| PE39YED1PR | 110/115VAC |
| PE39YED1BPR | 110/115VAC with cooling option |
| PE39PED1PR | 220/230VAC |
| PE39PED1BPR | 220/230VAC with cooling option |

OPTIONS

- Auxiliary Cooling Fan (Field Installable)
Order No. 3000610

CLASSIC SERIES ELECTRIC HYDRAULIC PUMP

PE55TWP-BS
700 bar/10,000 psi



700 BAR (10,000 PSI) CLASSIC SERIES ELECTRIC HYDRAULIC PUMP

The PE55TWP-BS has been the market leading electric pump for over 30 years & is therefore tried & tested. A simple, light-weight design with a recent upgrade that has created a cost-effective workhorse.

Quality means Lower Life-Cycle Costs:

- Over 100,000 cycles
- Continuous duty up to 50°C (122°F) ambient
- Proven design = Proven reliability

Enhanced Usability:

- Two Speed High Performance pump
- Retract side internal relief valve protects tool
- Hand remote
- Four-tool manifold (-4 models only) allow use of up to four tools simultaneously
- 4" calibration capable gauge
- Use with single or double acting tools

Designed with Safety in Mind:

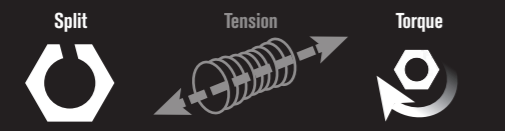
- Easily adjusted pressure regulator (relief) valve
- 103 bar (1,500 psi) pressure retract relief valve

DESIGNED FOR



MAINTENANCE & REPAIR

ORIGINAL INSTALL



Max Flow



Specifications and Dimensional Data

Size (L x W x H): 147 cm x 24 cm x 49 cm
18.5" x 9.5" x 19.2"

Weight: 29.5 kg (65 lb) [without oil]

Maximum Oil Capacity: (vented reservoir)
6.8 L (1.8 Gallons) [to fill line]
5.3 L (1.4 Gallons) [usable]

Operating Environment: -25°C to +50°C
(-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

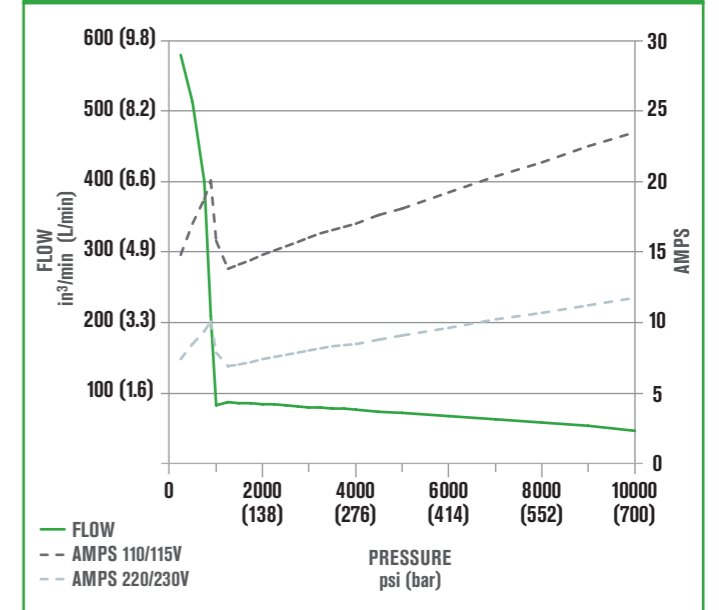
Sound Level: 87-92 dBA (max)

Pressure: 0 - 700 bar (0 - 10,000 psi)

Typical Flow: 11.5 L/min - 0.9 L/min
(704 in³/min - 56 in³/min)

Power: 1-1/8 hp Universal Motor
110/115V - 50/60 Hz (25 amps)
220/230V - 50/60 Hz (13 amps)

Typical Flow Curve



| Order No. | Oil Delivery per min. | Oil Reservoir gal | Usable Oil in ³ | Overall Width | Overall Length | Overall Height | Pump Weight w/Oil |
|---|---|-------------------|----------------------------|------------------|----------------|------------------|-------------------|
| PE55TWP-BS PE55TWP-220-BS | 704 in ³ @ 100 psi 11.5 L/min @ 6.9 bar 56 in ³ @ 10,000 psi 0.9 L/min @ 700 bar | 2.5 | 324 | 17.14" 435 mm | 9.5" 241 mm | 18.12" 460 mm | 75 lb 34 kg |
| PE55TWP-4-BS PE55TWP-4-CF-BS PE55TWP-4-220-BS | 704 in ³ @ 100 psi 11.5 L/min @ 6.9 bar 56 in ³ @ 10,000 psi 0.9 L/min @ 700 bar | 2.5 | 324 | 18.49" 470 mm | 9.5" 241 mm | 19.15" 487 mm | 78 lb 35.5 kg |

Electrical Data

| | Electric Motor | Electrical Control |
|---|---|----------------------------------|
| PE55TWP-BS PE55TWP-4-BS PE55TWP-4-CF-BS | 1-1/8 hp, 12000 rpm 110/150V, 50/60Hz, 25 amps | Remote control with 20-foot cord |
| PE55TWP-220-BS PE55TWP-4-220-BS | 1-1/8 hp, 12000 rpm 220/230V, 50/60Hz, 13 amps | |

Ordering Information

| Order No. | Description |
|------------------|--|
| PE55TWP-BS | 110/115V, 50/60 Hz, Single Tool |
| PE55TWP-4-BS | 110/115V, 50/60 Hz, 4 Tool |
| PE55TWP-4-CF-BS | 110/115V, 50/60 Hz, 4 Tool, with Cooling Fan |
| PE55TWP-220-BS | 220/230V, 50/60 Hz, Single Tool |
| PE55TWP-4-220-BS | 220/230V, 50/60 Hz, 4 Tool |

Contact factory for CE pump options

LEGACY SERIES ELECTRIC HYDRAULIC PUMP

X1E1-PT
700 bar/10,000 psi



700 BAR (10,000 PSI) CLASSIC SERIES ELECTRIC HYDRAULIC PUMP

The original electric pump! Features a simplified electrical control box and a proven, reliable design. Typically sold to customers that already have a fleet of similar pumps.

Quality means Lower Life-Cycle Costs:

- Over 100,000 cycles
- Continuous duty up to 50°C (122°F) ambient
- Proven design = Proven reliability

Enhanced Usability:

- Power Team, two-speed high performance, PE55 base pump
- Retract side internal relief valve protects tool
- 4-way 2-position solenoid valve standard
- Use with single or double acting tools, not for lifting applications
- Hand remote standard

Designed with Safety in Mind:

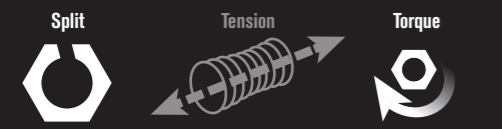
- Easily adjusted pressure regulator (relief) valve
- Fixed 103 bar (1,500 psi) pressure retract relief valve

DESIGNED FOR



MAINTENANCE & REPAIR

ORIGINAL INSTALL



Max Flow



Specifications and Dimensional Data

Size (L x W x H): 35 cm x 33 cm x 46 cm
13.9" x 13.1" x 18.1"

Weight: 35.3 kg (78 lb) [without oil]

Maximum Oil Capacity: (vented reservoir)
6.8 L (1.8 Gallons) [to fill line]
5.3 L (1.4 Gallons) [usable]

Operating Environment: -25°C to +50°C
(-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

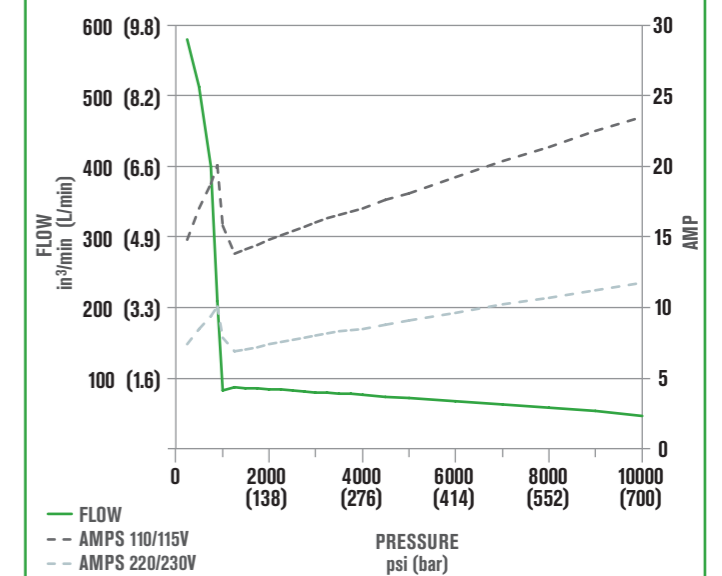
Sound Level: 87-92 dBA (max)

Pressure: 0 - 700 bar (0 - 10,000 psi)

Typical Flow: 11.5 L/min - 0.9 L/min
(704 in³/min - 55 in³/min)

Power: 1-1/8 hp Universal Motor
110/115V - 50/60 Hz (25 amps)
220/230V - 50/60 Hz (13 amps)

Typical Flow Curve



| Order No. | Oil Delivery per min. | Oil Reservoir | Usable Oil | Overall Width | Overall Length | Overall Height | Pump Weight w/Oil |
|-----------|---------------------------------|---------------|----------------------|---------------|----------------|----------------|-------------------|
| | | gal L | in ³ L | in cm | in cm | in cm | lb kg |
| X1E1-PT | 55 in ³ @ 10,000 psi | 2.5 | 324 | 13.9 | 13.1 | 18.1 | 90 |
| | 0.9 L @ 700 bar | 9.5 | 5.3 | 35 | 33 | 46 | 41 |

Electrical Data

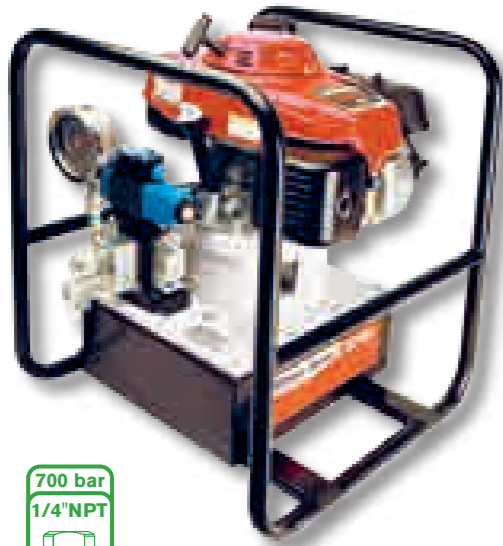
| Order No. | Electric Motor | Electrical Control |
|-----------|----------------|--|
| | X1E1-PT | 1-1/8 hp, 12000 rpm 110/115V, 50/60 Hz, 25 amps |

Ordering Information

| Order No. | Description |
|-----------|---------------------------------|
| X1E1-PT | 110/115V, 50/60 Hz, Single Tool |
| X1E2-PT | 220/230V, 50/60 Hz, Single Tool |

CLASSIC SERIES GAS HYDRAULIC PUMP

PG120TWP
700 bar/10,000 psi



700 BAR (10,000 PSI) CLASSIC SERIES GAS HYDRAULIC PUMP

Gasoline powered pump for use in remote locations where electricity or compressed air are not readily available.

Operates on a powerful 5.5 hp Honda OHV-type engine.

Quality means Lower Life-Cycle Costs:

- High quality, reliable gasoline engine
- Continuous duty
- Proven design = proven reliability

Enhanced Usability:

- Air cooled 4-stroke engine
- Uses standard unleaded gasoline
- Large capacity, multi-chamber exhaust system to reduce noise

Designed with Safety in Mind:

- Fixed 48 bar (700 psi) Unload Valve
- Frame allows for easy two man carry

Specifications and Dimensional Data

Size (L x W x H): 54 cm x 50 cm x 59 cm
21.25" x 19.75" x 23"

Weight: 55 kg (121 lb) [without oil]

Maximum Oil Capacity: (vented reservoir)
10.2 L (2.7 Gallons) [to fill line]
9.4 L (2.5 Gallons) [usable]

Operating Environment: -25°C to +50°C
(-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

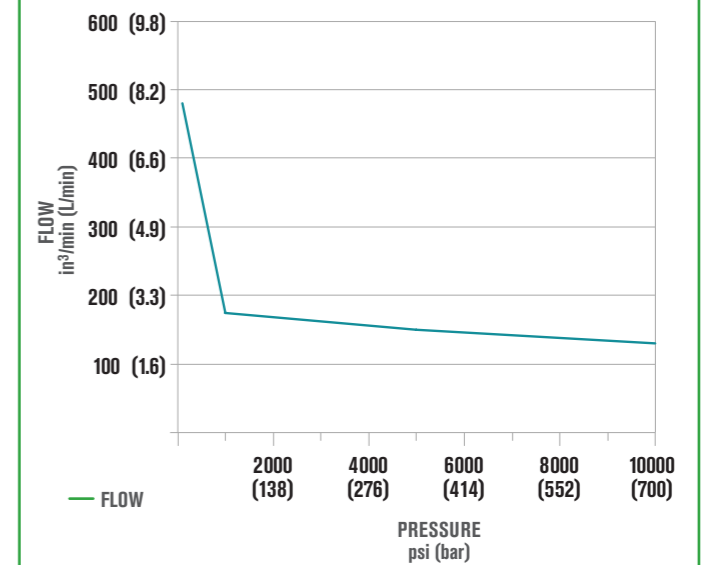
Sound Level: 85-92 dBA (max)

Pressure: 0 - 700 bar (0 - 10,000 psi)

Typical Flow: 7.87 L/min - 2.13 L/min
(480 in³/min - 130 in³/min)

Power: 5.5 hp Honda OHV-Type Gasoline Engine, 3600 rpm

Typical Flow Curve



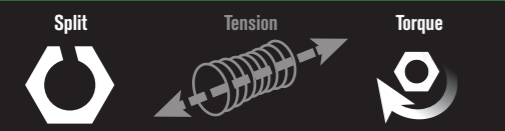
| Order No. | Oil Delivery per min. | | Oil Reservoir | Usable Oil | Overall Width | | Overall Length | | Overall Height | | Pump Weight w/Oil | |
|-----------|-------------------------------|----------------------|---------------|-----------------|---------------|----|----------------|----|----------------|----|-------------------|------|
| | in ³ @ 100 psi | L/min @ 100 psi | gal | in ³ | in | cm | in | cm | in | cm | lb | kg |
| PG120TWP | 480 in ³ @ 100 psi | 7.87 L/min @ 100 psi | 3 | 572 | 19.75 | 50 | 21.25 | 54 | 23 | 59 | 126 | 57.2 |

DESIGNED FOR



MAINTENANCE & REPAIR

ORIGINAL INSTALL



Max Flow



Ordering Information

| Order No. | Description |
|-----------|----------------------------|
| PG120TWP | Gasoline Pump, Single Tool |

CLASSIC SERIES AIR HYDRAULIC PUMP

RWP55-BS
700 bar/10,000 psi



700 BAR (10,000 PSI) CLASSIC SERIES AIR HYDRAULIC PUMP

The RWP55-BS has been the market leading pump for over 30 years & is therefore tried & tested. A simple, light-weight design with a recent upgrade that has created a cost-effective workhorse.

Quality means Lower Life-Cycle Costs:

- Over 100,000 cycles
- Continuous duty up to 50°C (122°F) ambient
- Proven design = Proven reliability

Enhanced Usability:

- Powerful 3 hp motor starts under load
- Retract side internal relief valve protects tool
- Use with single or double acting tools. Not for lifting applications
- 4" calibration capable gauge

Designed with Safety in Mind:

- Easily adjusted pressure regulator (relief) valve
- Has a retract port pressure selector 1,500 or 10,000 psi

Specifications and Dimensional Data

Size (L x W x H): 42 cm x 24 cm x 50 cm
16.6" x 9.5" x 19.8"

Weight: 38 kg (84 lb) [without oil]

Maximum Oil Capacity: (vented reservoir)
6.8 L (1.8 Gallons) [to fill line]
5.3 L (1.4 Gallons) [usable]

Operating Environment: -25°C to +50°C
(-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

Sound Level: 85-92 dBA (max)

Pressure: 0 - 700 bar (0 - 10,000 psi)

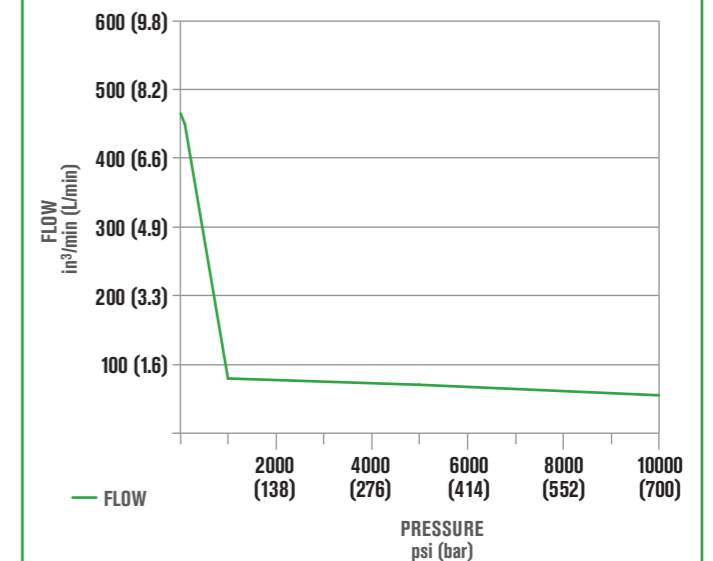
Typical Flow: 7.6 L/min - 0.9 L/min
(465 in³/min - 55 in³/min)

Air: 1.4 m³/min @ 5.5 bar (50 cfm @ 80 psi)
1.65 m³/min @ 6.2 bar (58 cfm @ 90 psi)
1.89 m³/min @ 6.9 bar (67 cfm @ 100 psi)

* Values shown are with filter/regulator/lubricator.
Values will increase without filter/regulator/
lubricator.



Typical Flow Curve

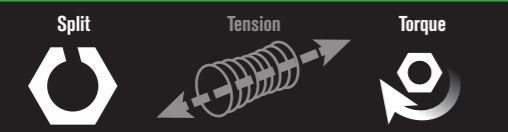


DESIGNED FOR



MAINTENANCE
& REPAIR

ORIGINAL
INSTALL



Max
Flow



| Order No. | Oil Delivery per min | Oil Reservoir gal | Usable Oil in ³ | Overall Width in | Overall Length in | Overall Height in | Pump Weight w/Oil lb |
|------------------------------|---------------------------------|-------------------|----------------------------|------------------|-------------------|-------------------|----------------------|
| RWP55-BS | 465 in ³ @ 100 psi | 2.5 | 324 | 16.55 | 9.5 | 19.83 | 98 |
| | 55 in ³ @ 10,000 psi | | | | | | |
| RWP55-4-BS (4-tool manifold) | 465 in ³ @ 100 psi | 2.5 | 324 | 16.55 | 9.5 | 19.83 | 98 |
| | 55 in ³ @ 10,000 psi | | | | | | |

Motor Data

| | Air Motor | Air Control |
|----------|-----------------------|--|
| RWP55-BS | 3 hp, 50 cfm @ 80 psi | Pneumatic remote control with 25-foot cord |

Ordering Information

| Order No. | Description |
|--------------|---------------------------------------|
| RWP55-BS | Air Pump, Single tool |
| RWP55-BS-R | Air Pump, Single tool, with roll cage |
| RWP55-4-BS | Air Pump, 4 tool |
| RWP55-4-BS-R | Air Pump, 4 tool, with roll cage |

LEGACY SERIES AIR HYDRAULIC PUMP

X1A1-PT
700 bar/10,000 psi



700 BAR (10,000 PSI) CLASSIC SERIES AIR HYDRAULIC PUMP

The original air pump! Features a proven, reliable design. Typically sold to customers that already have a fleet of similar pumps.

Quality means Lower Life-Cycle Costs:

- Over 100,000 cycles
- Continuous duty up to 50°C (122°F) ambient
- Proven design = Proven reliability

Enhanced Usability:

- Power Team, two-speed high performance, PA55 base pump
- Retract side internal relief valve protects tool
- 4-way 2-position air pilot valve standard
- Use with single or double acting tools. Not for lifting applications.
- Hand remote standard

Designed with Safety in Mind:

- Easily adjusted pressure regulator (relief) valve
- Fixed 103 bar (1,500 psi) pressure retract relief valve

Specifications and Dimensional Data

Size (L x W x H): 27 cm x 46 cm x 48 cm
10.8" x 18" x 18.8"

Weight: 34 kg (75 lb) [without oil]

Maximum Oil Capacity: (vented reservoir)
6.8 L (1.8 Gallons) [to fill line]
5.3 L (1.4 Gallons) [usable]

Operating Environment: -25°C to +50°C
(-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

Sound Level: 85-92 dBA (max)

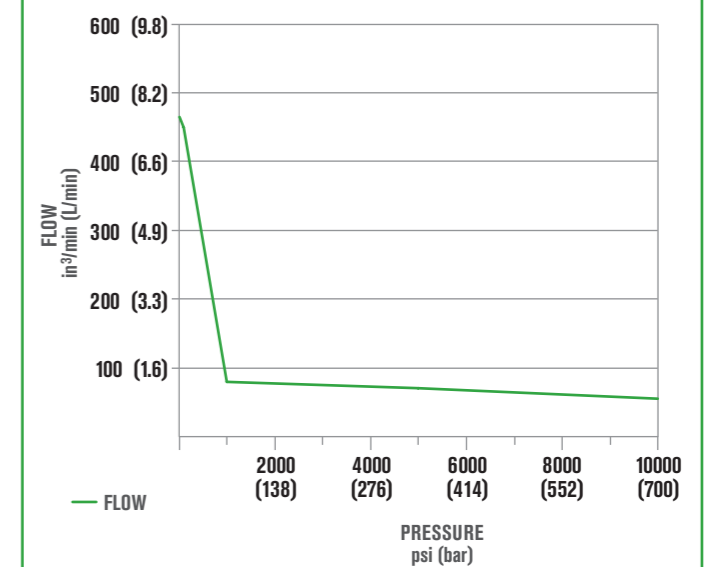
Pressure: 0 - 700 bar (0 - 10,000 psi)

Typical Flow: 7.6 L/min - 0.9 L/min
(465 in³/min - 55 in³/min)

Air: 1.4 m³/min @ 5.5 bar (50 cfm @ 80 psi)
1.65 m³/min @ 6.2 bar (58 cfm @ 90 psi)
1.89 m³/min @ 6.9 bar (67 cfm @ 100 psi)

* Values shown are with filter/regulator/lubricator.
Values will increase without filter/regulator/lubricator.

Typical Flow Curve



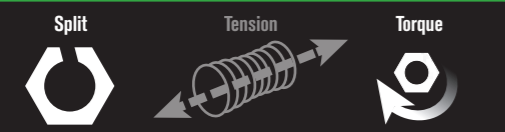
| Order No. | Oil Delivery per min. | Oil Reservoir gal | Usable Oil in ³ | Overall Width in | Overall Length in | Overall Height in | Pump Weight w/Oil lb |
|-----------|---------------------------------|----------------------|-------------------------------|---------------------|----------------------|----------------------|----------------------------|
| X1A1-PT | 465 in ³ @ 100 psi | 2.5 | 324 | 10.75 | 18 | 18.75 | 89 |
| | 55 in ³ @ 10,000 psi | | | | | | |

DESIGNED FOR



MAINTENANCE
& REPAIR

ORIGINAL
INSTALL



Max
Flow



Ordering Information

| Order No. | Description |
|-----------|-----------------------|
| X1A1-PT | Air Pump, Single tool |

HAND PUMPS

HYDRAULIC P SERIES

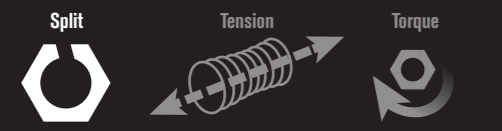
700 bar/10,000 psi



DESIGNED FOR



MAINTENANCE & REPAIR **ORIGINAL INSTALL**



PUMP AUTOMATICALLY SHIFTS INTO THE HIGH PRESSURE STAGE UPON CONTACT WITH THE LOAD.

- All metal construction won't burn through in welding environments.
- Two-speed reduces handle strokes so you work faster and easier.
- Convenient fill port allows pumps to be filled in a horizontal or vertical position.
- Relief valve inboard of check valve prevents loads from drifting down.
- Large valve knob gives added control for slowly metering loads down.

P19L/P59L

- More usable oil volume — use with larger or longer stroke cylinders.
- True unloading valve set for 59 bar (850 psi) provides more efficiency and lower handle force.
- Link design reduces handle effort by 40%.
- Durable aluminum reservoir, manifold, and end cap.
- Ergonomic non-slip handle grip provides more comfort.
- Spring loaded handle lock incorporated into handle.

P19/P59/P59F

- Steel reservoir
- Strong lever
- Lower handle effort (measured)
- Higher unloading pressure 22 bar (325 psi)
- Pump is serviceable (all components available)
- Durable aluminum pump head
- No breather opening needed (so no leakage)
- True unloading (more flow/ lower effort)
- Pump mounting holes on front and back
- Solid accurate repeatable Integrated lifting system
- Can be used in welding environment (no plastic)

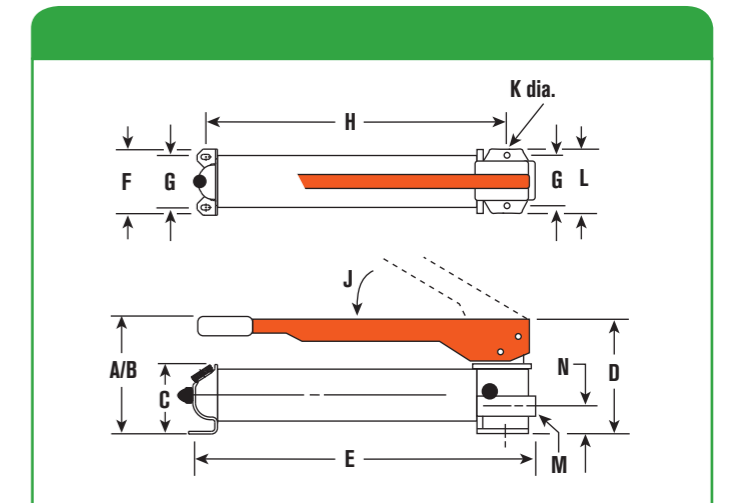
No coupler included with these pumps.

Specifications and Dimensional Data

Operating Environment: -25°C to +50°C (-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

Pressure: 0 - 700 bar (0 - 10,000 psi)

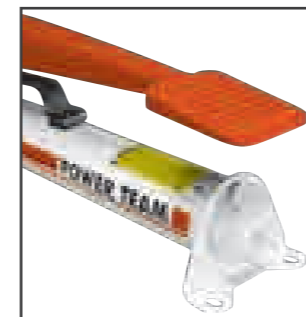


| Order No. | A in | B in | C in | D in | E in | F in | G in | H in | J deg | K in | L in | M in | N in |
|-----------|-------|--------|-------|--------|----------|-------|-------|---------|-------|------|-------|----------|---------|
| P19 | 5-1/2 | 14-5/8 | 2-7/8 | 4-9/16 | 13-11/16 | 4 | 3-1/4 | 11-1/16 | 53° | 5/16 | 4 | 3/8 NPTF | 1-13/32 |
| P19L | 5-1/2 | — | — | — | 13-11/16 | 4-1/8 | 3-1/4 | 11 | 40° | 5/16 | — | 3/8 NPTF | — |
| P59 | 7 | 21 | 3-1/2 | 5 | 23 | 4-1/4 | 3-1/4 | 19-3/4 | 38° | 5/16 | 4-3/4 | 3/8 NPTF | 1-5/8 |
| P59L | 7 | — | — | — | 21 | 5 | 3-1/4 | 19-3/4 | 50° | 5/16 | — | 3/8 NPTF | — |
| P59F | 3-1/2 | 16-3/4 | 3-1/2 | 6 | 23-1/4 | 4-1/4 | 3-1/4 | 20-1/4 | — | 5/16 | 4-1/2 | 3/8 NPTF | — |

Ordering Information

| For Use With | Order No. | Speed | Volume & Pressure | | Reservoir Handle Effort lb | Oil Capacity cu in | Usable Oil Capacity cu in | Oil Port in | Product Weight lb | | |
|--------------------|-----------|-------|-----------------------------|------------------------|----------------------------|--------------------|---------------------------|-------------|-------------------|----------|------|
| | | | Volume per Stroke (cu. in.) | Maximum Pressure (psi) | | | | | | | |
| Single Acting | P19 | 2 | 0.305 | 0.076 | 325 | 10,000 | 99 | 24.4 | 20 | 3/8 NPTF | 6.6 |
| | P19L | 2 | 0.250 | 0.050 | 850 | 10,000 | 78 | 29 | 27 | 3/8 NPTF | 5.1 |
| | P59 | 2 | 0.662 | 0.160 | 325 | 10,000 | 145 | 55 | 45 | 3/8 NPTF | 17.2 |
| Tools & Cylinders* | P59L | 2 | 0.720 | 0.150 | 850 | 10,000 | 104 | 69 | 66 | 3/8 NPTF | 8.9 |
| | P59F | 2 | 0.550 | 0.130 | 325 | 10,000 | 120 | 55 | 45 | 3/8 NPTF | 14 |

LP = Low Pressure
HP = High Pressure
*Pump includes 2-Way Valve



Foot Pump Conversion Kit

No. FK59 - Foot pump conversion kit for use on P55/P59 pumps. Wt., 6 lb

PUMPS

FOR TENSIONERS

1,500 BAR (21,750 PSI) - HIGH PERFORMANCE HYDRAULIC PUMPS

Page
PE8...92-93
High Pressure Electric Pump



Page
HPUTP-2...96-97
High Flow & Subsea Tensioner
Power Pack



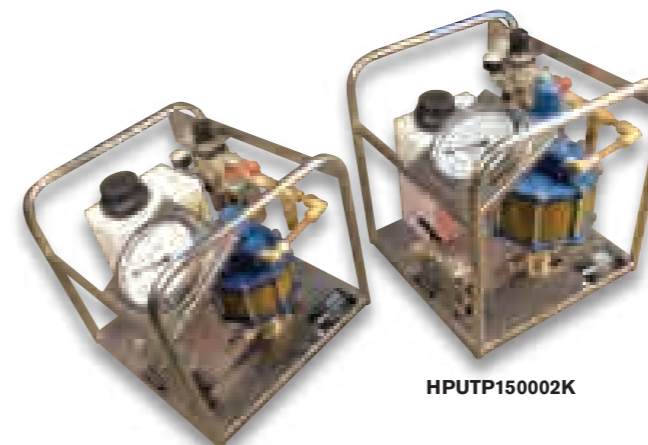
Page
HPUTP-1...94-95
Standard Flow Tensioner
Power Pack



Page
**HIGH PRESSURE
HAND PUMPS...98-99**
1,500 bar (21,750 psi)



SIDE BY SIDE COMPARISON OF HPUTP-1 AND HPUTP-2 PUMPS



HPUTP150001K

HPUTP150002K

The HPUTP-2 produces more flow, has a larger motor and frame and weighs approximately 4 kg (9 lb) more.



CAUTION! These pumps can produce pressure in excess of 10,000 psi (700 bar). Check all components that are used with these pumps and never exceed the rated pressure of any component.

HIGH PRESSURE ELECTRIC PUMP

PE8

1,500 bar/21,750 psi



1,500 BAR (21,750 PSI) HIGH PRESSURE ELECTRIC PUMP

The PE8 is a very high pressure pump that incorporates proven design for reliable operation. It is based on proven pump design for reliability in rugged bolt tensioning applications.

Quality means Lower Life-Cycle Costs:

- Over 100,000 cycles
- Continuous duty up to 50°C (122°F) ambient
- Proven design = Proven reliability

Enhanced Usability:

- Light Weight and portable: 20.6 kg (45.5 lb) [without oil]
- Quick Release, removable control pendant (5 m/15 ft)
- Removable 100 mm (4"), calibration-capable, gauge
- Universal Motor for reduced voltage applications (up to -20% nominal voltage)
- SPX Tensioners are designed to daisy-chain together so multiple tools can run off one pump
- Compact design fits into tight spaces

Designed with Safety in Mind:

- Easily adjusted pressure regulator (relief) valve

Specifications and Dimensional Data

Size (L x W x H): 35.8 cm x 19.8 cm x 41.4 cm
14.1" x 7.8" x 16.3"

Weight: 20.6 kg (45.5 lb) [without oil]

Maximum Oil Capacity: (vented reservoir)
3.8 L (1.0 Gallons) [to fill line]
3.4 L (0.9 Gallons) [usable]

Operating Environment: -25°C to +50°C
(-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

Sound Level: 87-92 dBA (max)

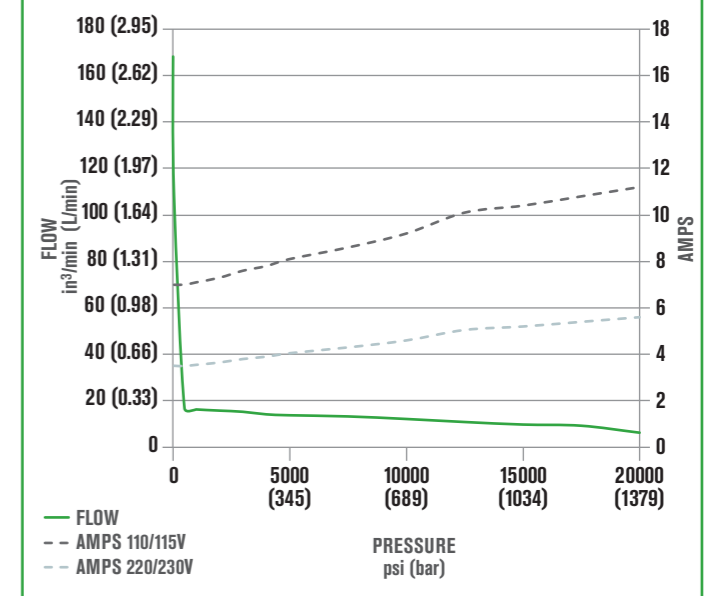
Pressure: 0 - 1,500 bar (0 - 21,750 psi)

Typical Flow: 2.7 L/min - 0.13 L/min
(168 in³/min - 8 in³/min)

Power: 0.5 hp Universal Motor
110/115V - 50/60 Hz (11 amps)
220/230V - 50/60 Hz (5.5 amps)



Typical Flow Curve

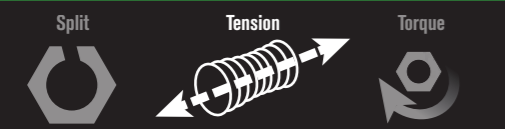


DESIGNED FOR

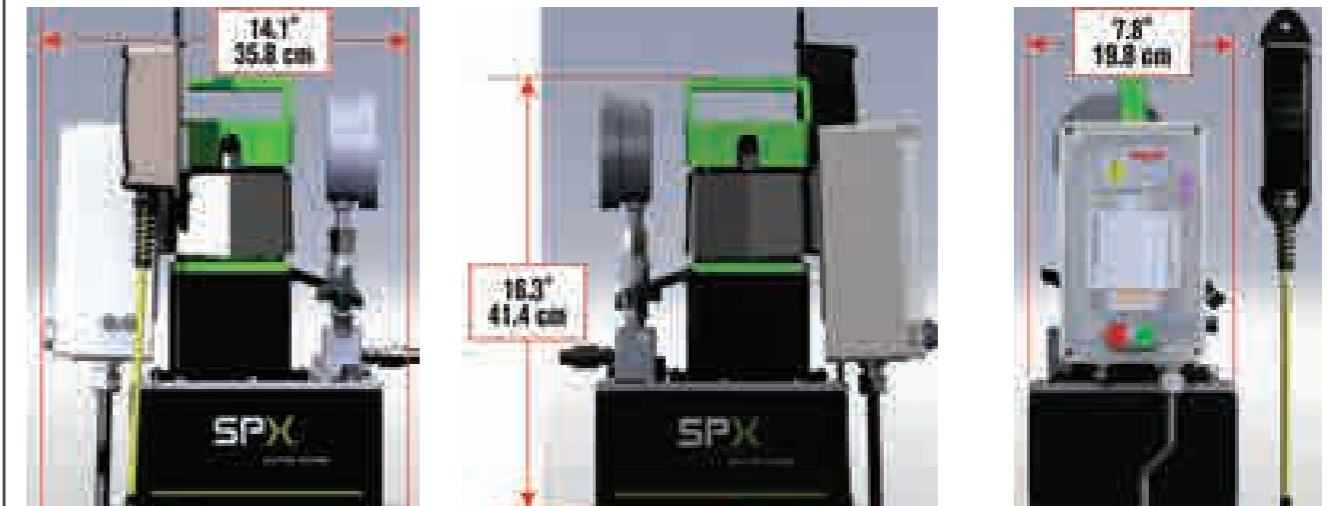


MAINTENANCE & REPAIR

ORIGINAL INSTALL



Max Flow



Ordering Information

| Order No. | Description |
|-----------|--------------------------|
| PE8LXX3L | 110/115VAC 50/60Hz Motor |
| PE8PXX3L | 220/230VAC 50/60Hz Motor |

STANDARD FLOW TENSIONER PUMP

HPUTP-1

1,500 bar/21,750 psi



HPUTP150001K



1,500 BAR (21,750 PSI) TOPSIDE BOLT TENSIONER & HYDRAULIC NUT PUMP

Standard flow tension pump. Corrosion resistant frame works well for applications near salt water. Standard flow ideal for land based (topside) tension applications where the required power source is compressed air.

Quality means Lower Life-Cycle Costs:

- Over 100,000 cycles
- Continuous duty up to 50°C (122°F) ambient
- Proven design = Proven reliability

Enhanced Usability:

- Calibrated 150 mm (6") Pressure Gauge
- Dual oil outlets with quick-connect, no spill couplings
- Pneumatic Filter/Regulator/Lubricator included
- Stainless Steel carrying frame

Designed with Safety in Mind:

- Easily adjusted pressure regulator valve
- Air pressure safety relief valve

Specifications and Dimensional Data

Size (L x W x H): 42 cm x 42 cm x 39 cm
16.5" x 16.5" x 15.5"

Weight: 21 kg (46 lb) [without oil]

Maximum Oil Capacity: (vented reservoir)
9.5 L (2.5 Gallons) [to fill line]
9.4 L (2.5 Gallons) [usable]

Operating Environment: -25°C to +50°C
(-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

Sound Level: 85 dBA (max)

Pressure: 0 - 1,500 bar (0 - 21,750 psi)

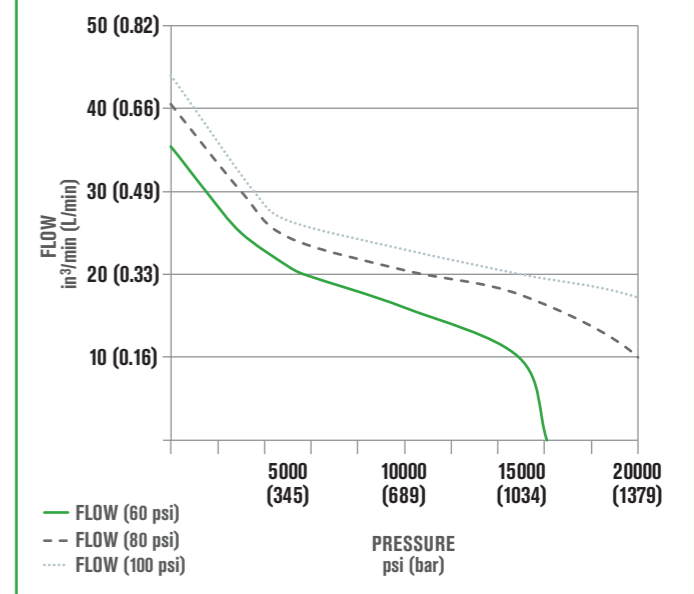
Typical Flow: 0.72 L/min - 0.28 L/min
(44 in³/min - 17 in³/min)

Air: 0.68 m³/min @ 5.5 bar (24 cfm @ 80 psi)
0.74 m³/min @ 6.2 bar (26 cfm @ 90 psi)
0.80 m³/min @ 6.9 bar (28 cfm @ 100 psi)

* Values shown are with filter/regulator/lubricator.
Values will increase without filter/regulator/lubricator.



Typical Flow Curve



Hydraulic Oil Delivery

| | @ 6.9 bar @ 100 psi | @ 5.5 bar @ 80 psi | @ 4.1 bar @ 60 psi |
|---------------------------|---|---|---|
| 750 psi (51 bar) | 41 in ³ /min (0.67 L/min) | 38 in ³ /min (0.62 L/min) | 33 in ³ /min (0.54 L/min) |
| 2,500 psi (175 bar) | 35 in ³ /min (0.57 L/min) | 33 in ³ /min (0.54 L/min) | 27 in ³ /min (0.44 L/min) |
| 5,000 psi (350 bar) | 27 in ³ /min (0.44 L/min) | 25 in ³ /min (0.40 L/min) | 21 in ³ /min (0.34 L/min) |
| 10,000 psi (689 bar) | 23 in ³ /min (0.38 L/min) | 21 in ³ /min (0.34 L/min) | 16 in ³ /min (0.26 L/min) |
| 15,000 psi (1,000 bar) | 20 in ³ /min (0.33 L/min) | 18 in ³ /min (0.29 L/min) | 9 in ³ /min (0.15 L/min) |
| 21,750 psi (1,500 bar) | 15 in ³ /min (0.24 L/min) | - | - |

Ordering Information

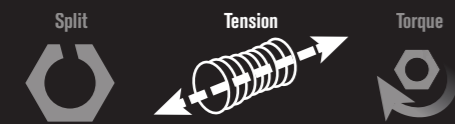
| Order No. | Description |
|--------------|--|
| HPUTP150001K | 1,500 Bar Standard Flow Tensioner Pump |

DESIGNED FOR



MAINTENANCE & REPAIR

ORIGINAL INSTALL



Max Flow



HIGH FLOW & SUBSEA TENSIONER PUMP

HPUTP-2

1,500 bar/21,750 psi



HPUTP150002K



1,500 BAR (21,750 PSI) SUBSEA & LARGE TENSIONER APPLICATIONS

High flow tension pump. Corrosion resistant frame works well for applications near salt water. High flow ideal for subsea applications where compressed air is the required power source.

Quality means Lower Life-Cycle Costs:

- Over 100,000 cycles
- Continuous duty up to 50°C (122°F) ambient
- Proven design = Proven reliability

Enhanced Usability:

- Calibrated 150 mm (6") Pressure Gauge
- Dual oil outlets with quick-connect, no spill couplings
- Pneumatic Filter/Regulator/Lubricator included
- Stainless Steel carrying frame

Designed with Safety in Mind:

- Easily adjusted pressure regulator valve
- Air pressure safety relief valve

Specifications and Dimensional Data

Size (L x W x H): 46 cm x 53 cm x 52 cm
17.9" x 20.8" x 15.3"

Weight: 23 kg (51 lb) [without oil]

Maximum Oil Capacity: (vented reservoir)
9.5 L (2.5 Gallons) [to fill line]
9.4 L (x2.5 Gallons) [usable]

Operating Environment: -25°C to +50°C
(-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

Sound Level: 85 dBA (max)

Pressure: 0 - 1,500 bar (0 - 21,750 psi)

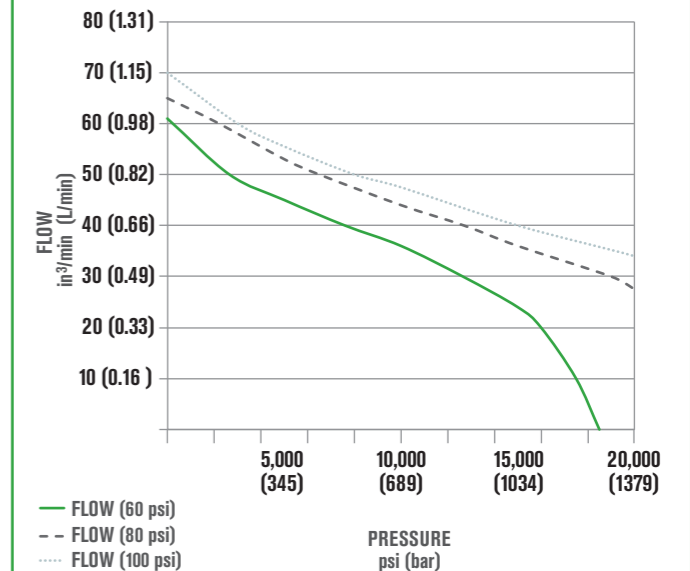
Typical Flow: 1.15 L/min - 0.50 L/min
(70 in³/min - 31 in³/min)

Air: 1.42 m³/min @ 5.5 bar (52 cfm @ 80 psi)
1.53 m³/min @ 6.2 bar (54 cfm @ 90 psi)
1.60 m³/min @ 6.9 bar (56 cfm @ 100 psi)

* Values shown are with filter/regulator/lubricator.
Values will increase without filter/regulator/lubricator.



Typical Flow Curve

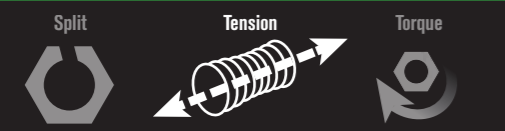


DESIGNED FOR



MAINTENANCE & REPAIR

ORIGINAL INSTALL



Max Flow



Hydraulic Oil Delivery

| | @ 6.9 bar @ 100 psi | @ 5.5 bar @ 80 psi | @ 4.1 bar @ 60 psi |
|---------------------------|---|---|---|
| 750 psi (51 bar) | 68 in ³ /min (1.11 L/min) | 63 in ³ /min (1.04 L/min) | 59 in ³ /min (0.97 L/min) |
| 2,500 psi (175 bar) | 63 in ³ /min (1.03 L/min) | 59 in ³ /min (0.97 L/min) | 53 in ³ /min (0.87 L/min) |
| 5,000 psi (350 bar) | 56 in ³ /min (0.91 L/min) | 53 in ³ /min (0.87 L/min) | 45 in ³ /min (0.74 L/min) |
| 10,000 psi (689 bar) | 48 in ³ /min (0.78 L/min) | 44 in ³ /min (0.72 L/min) | 36 in ³ /min (0.59 L/min) |
| 15,000 psi (1,000 bar) | 40 in ³ /min (0.66 L/min) | 36 in ³ /min (0.59 L/min) | 24 in ³ /min (0.39 L/min) |
| 21,750 psi (1,500 bar) | 31 in ³ /min (0.51 L/min) | - | - |

Ordering Information

| Order No. | Description |
|--------------|------------------------------------|
| HPUTP150002K | 1,500 Bar High Flow Tensioner Pump |

HIGH PRESSURE HAND PUMP

1,500 bar/21,750 psi



HPUHP150001



TWO STAGE, HIGH PRESSURE HAND PUMP

- Two-speed reduces handle strokes so you work faster and easier
- Built-in, protected pressure gauge
- Ergonomic design for minimal handle effort
- Lightweight aluminum reservoir
- Easily accessible refill port
- Needle valve allows full control when releasing tension

Specifications and Dimensional Data

Size: (L x W x H): 62 cm x 11 cm x 17 cm
24.4" x 4.3" x 6.7"

Weight: 8.7 kg (19.1 lb) [with oil]

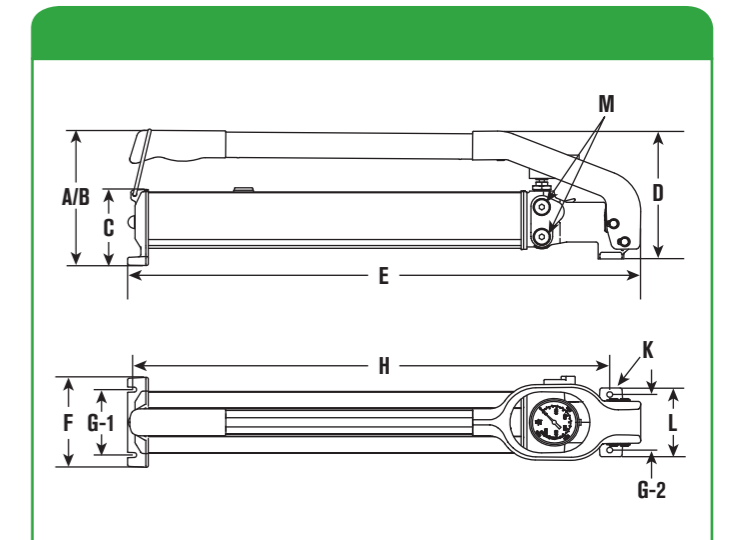
Maximum Oil Capacity: (vented reservoir)
1.1 L (0.29 Gallons) [to fill line]
1.0 L (0.26 Gallons) [usable]

Operating Environment: -25°C to +50°C
(-13°F to +122°F)

(When operating near temperature extremes, it is recommended to use hydraulic oils that are rated for those temperatures. Refer to service manuals and cooling options)

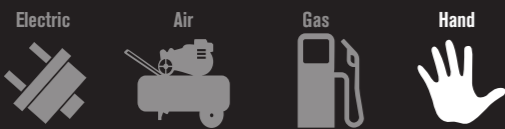
Pressure: 0 - 1,500 bar (0 - 21,750 psi)

Typical Flow: 20 cm³ stroke - 1 cm³ stroke
(1.22 in³/stroke - 0.061 in³/stroke)

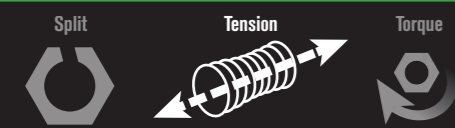


| Order No. | A mm in | B mm in | C mm in | D mm in | E mm in | F mm in | G1 mm in | G2 mm in | H mm in | J deg | K mm in | L mm in | M mm in |
|-------------|---------|---------|---------|---------|---------|---------|----------|----------|---------|-------|---------|---------|---------|
| HPUHP150001 | 170 | 560 | 152 | 170 | 620 | 110 | 80 | 68 | 575 | 55 | 6.6 | 84 | 61/4" |
| | 6.69 | 22 | 6 | 6.69 | 24.41 | 4.33 | 3.15 | 2.68 | 22.64 | 55 | 0.26 | 3.31 | 61/4" |

DESIGNED FOR



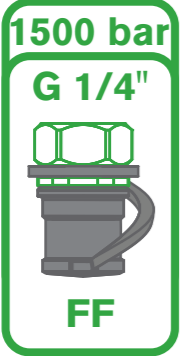
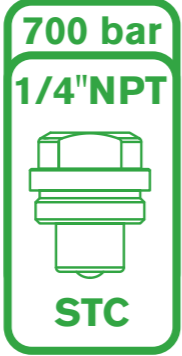
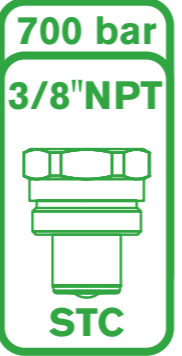
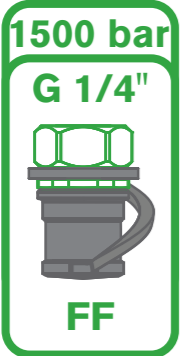


MAINTENANCE & REPAIR ORIGINAL INSTALL





Ordering Information

| For use with | Order No | Speed | Volume per Stroke | | Maximum Pressure | | Handle Effort | Oil Capacity | Usable Oil Capacity | Oil Port | Product Weight |
|--------------|-------------|-------|------------------------------------|------------------------------------|------------------|------------|---------------|--------------|---------------------|----------|----------------|
| | | | LP in ³ cm ³ | HP in ³ cm ³ | LP psi bar | HP psi bar | | | | | |
| Tensioners | HPUHP150001 | 2 | 1.22 | 0.061 | 290 | 21750 | 83 | 61 | 61 | 61/4" | 19.1 |
| | | | 20 | 1 | 20 | 1,500 | 370 | 1 | 1 | 61/4" | 8.7 |

ACCESSORIES

| Coupler Explanation | | | |
|---------------------|---------------------|--|--|
| | | 1,500 BAR (21,750 PSI) | 700 BAR (10,000 PSI) |
| | | TENSIONERS | TORQUE WRENCHES ENS SPLITTER |
| | | | OTHER TOOLS |
| TOPSIDE | 1500 bar G 1/4" |  |  |
| | 700 bar 3/8" NPT | |  |
| SUBSEA | 1500 bar G 1/4" |  | |
| | 700 bar 1/4" NPT |  |  |

Male FF couplers can connect to recessed style (standard), push to connect (PTC) couplers and Flat Face (optional) couplers. Contact factory for information about Flat Face coupler options.

| Coupler Icon Explanation | No Coupler Included |
|---|---|
|  <p>RATED PRESSURE 700 bar (10,000 psi) or 1,500 bar (21,750 psi)</p> <p>THREAD TYPE 1/4" NPT or 3/8" NPT or G 1/4"</p> <p>ICON FF</p> <p>COUPLER TYPE STC = Screw to Connect or FF = Flat Face or PTC = Push to Connect</p> | <p>Some products do not include couplers. Couplers need to be ordered separately.</p>  |

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TOPSIDE TORQUE WRENCH...102
Hoses, Couplers, and Accessories



Page
TOPSIDE TENSION...103
Hoses, Couplers, and Accessories



Page
SUBSEA TORQUE WRENCH...104
Hoses, Couplers, and Accessories



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SUBSEA TENSION...105
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Page
SPLITTERS & SPREADERS...106
Hoses, Couplers, and Accessories



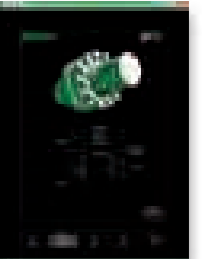
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HYDRAULIC FLUIDS...107
Standard
Flame Out
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FLANGE MANAGEMENT SYSTEMS...108-109
Flangepro



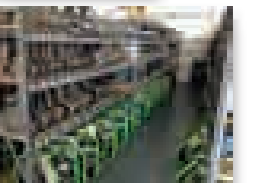
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TOPSIDE TORQUE WRENCH

1/4" COUPLERS

700 bar/10,000 psi



Twin-line Topside Hoses

| Standard IJ100 Twin-line Hoses (2:1 Burst) | |
|--|----------------------|
| Order No. | DESCRIPTION |
| TWH15-BS | 15 ft twin-line hose |
| TWH20-BS | 20 ft twin-line hose |
| TWH50-BS | 50 ft twin-line hose |

| Standard CE Twin-line Hoses (4:1 Burst) | |
|---|-------------------------|
| Order No. | DESCRIPTION |
| TWH3E | 3 meter twin-line hose |
| TWH6E | 6 meter twin-line hose |
| TWH10E | 10 meter twin-line hose |

Additional lengths (all styles) available upon request.

Tensioner Hoses

| Topside, with Locking Collar | |
|------------------------------|---|
| Order No. | DESCRIPTION |
| HL1M-LC | 1 m Hose, 1,500 bar, CE, with locking collar (only stocked in Europe & Asia) |
| HL13M-LC | 1.3 m Hose, 1,500 bar, CE, with locking collar (Optionally available in the Americas) |
| HL3M-LC | 3 m Hose, 1,500 bar, CE, with locking collar |
| HL5M-LC | 5 m Hose, 1,500 bar, CE, with locking collar |
| HL8M-LC | 8 m Hose, 1,500 bar, CE, with locking collar |
| HL10M-LC | 10 m Hose, 1,500 bar, CE, with locking collar |

For hoses without locking collars, remove "-LC" from the part number. In the Americas, the 1.3 m hose is typically stocked without a locking collar (No. HL13M). Hoses with locking collars are available upon request (No. HL13M-LC).

Additional lengths available upon request.

TOPSIDE TENSION

1,500 bar/21,750 psi



| | | |
|--------------------|--|--|
| 9072 | | 700 bar, 10,000 psi gauge for torque wrench applications |
| 9042DG | | 700 bar, 10,000 psi gauge for torque wrench applications. Custom scale enables the following units to be displayed: lb-ft or Nm |
| 252365 | | Metal Dust Cover for male coupler |
| 252364 | | Metal Dust Cover for female coupler |
| (male) 251411 | | Quick-connect, screw-on male nipple. Used on 700 bar torque wrenches, nutsplitters, hoses, and pumps. 1/4" NPT Female Thread |
| (female) 251410 | | Quick-connect, screw-on female coupling. Used on 700 bar torque wrenches, nutsplitters, hoses, and pumps. 1/4" NPT Female Thread |

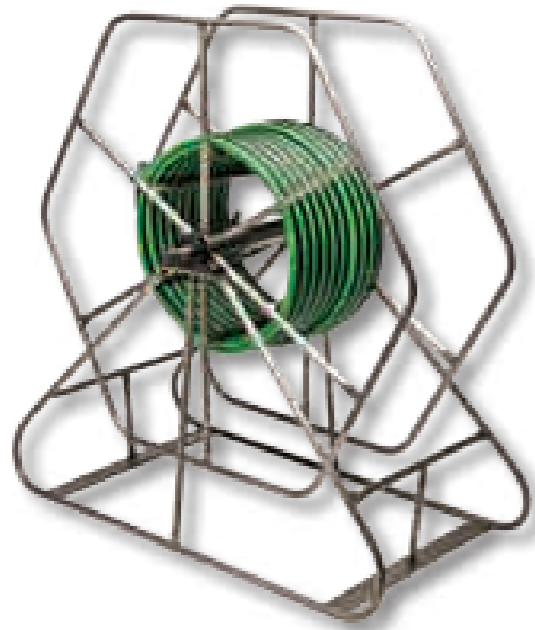
Refer to page 114 for complete calibration services

| | | |
|-------------|--|--|
| 2002278 | | 2,000 bar; 30,000 psi gauge for PE8 pumps. Typically attached with quick coupler (ordered separately). |
| HHAMA150001 | | 1,500 Bar Elbow Block: Used to change direction of tensioner hoses if standard orientation is not possible. Hoses can swivel around coupling axis. |
| HHAMA150003 | | 1,500 Bar Tee Block Assembly: Used to interconnect tensioners with single ports. |
| HHAMA150004 | | 1,500 Bar Banjo Assembly: Used to allow a hose to connect to a tool at 90 degrees. The nipple can be oriented in any direction around the port axis but must be tightened to create a seal. Does not act as a swivel around port axis. |

| | | |
|-------------|--|---|
| 2001772 | | Male Coupling: Quick-connect, push-in male nipple. Used on 1,500 bar tensioners and pumps. 6 1/4" Female Thread |
| 2008547 | | Female Coupling: Quick-connect, push-in female coupling with locking collar. Used on 1,500 bar tensioner hoses. 6 1/4" Female Thread. |
| STDHC000025 | | 1/4" BSP Plug: Used to plug a port when a banjo assembly or coupling will not be used. |

Hoses come standard with recessed female coupler type (2008547). Flat Face couplers available upon request.

SUBSEA TORQUE WRENCH
1/4" COUPLERS
700 bar/10,000 psi



Hose reel stand complete with twin down line for offshore equipment use.

Couplers for hose reel and offshore equipment.

| | | |
|--------------------|--|--|
| (male) 251411 | | Quick-connect, screw-on male nipple. Used on 700 bar torque wrenches, nutsplitters, hoses, and pumps. 1/4" NPT Female Thread |
| (female) 251410 | | Quick-connect, screw-on female coupling. Used on 700 bar torque wrenches, nutsplitters, hoses, and pumps. 1/4" NPT Female Thread |

Remote Diver Control Valve (HCUCV070001) uses 1 each of all four couplings shown on this page.

SUBSEA TWIN-LINE HOSES

SPX FLOW can customize a reel and hose combination for your specific job. Standard reel construction is powder coated carbon steel. Aluminum reels optional. Contact factory for details.

| Twin-line Subsea Hoses | |
|--|--|
| Order No. | DESCRIPTION |
| Standard CE Twin-line Subsea Hoses (4:1 Burst) | |
| TWH06E-SS | 6 meter (20 ft) twin-line subsea hose, uses red couplers shown below (2008549 & 2008550) |
| Standard IJ100 Twin-line Hoses (2:1 Burst) | |
| TWH100 | 30 meter (100 ft) twin-line subsea hose, uses red couplers shown below (2008549 & 2008550) |
| TWH100-SS | 30 meter (100 ft) twin-line subsea hose, uses stainless steel couplers |

Additional lengths (all styles) available upon request.

| | | |
|--------|--|---|
| 9072 | | 700 bar, 10,000 psi gauge for torque wrench applications |
| 9042DG | | 700 bar, 10,000 psi gauge for torque wrench applications. Custom scale enables the following units to be displayed: lb-ft or Nm |

Couplers for Diver Control Valve and select subsea tools.

| | | |
|---------------------|--|---|
| (male) 2008549 | | Quick-connect, push-in male nipple. Used on Subsea 700 bar torque wrenches, nutsplitters, flange pullers, hoses, and pumps. 1/4" NPT Female Thread |
| (female) 2008550 | | Quick-connect, push-in female coupling with locking collar. Used on 700 bar torque wrenches, nutsplitters, flange pullers, hoses, and pumps. 1/4" NPT Female Thread |

SUBSEA TENSION HOSES

SPX FLOW can customize a reel and hose combination for your specific job. Standard reel construction is powder coated carbon steel. Stainless hose reels optional. Contact factory for details.

Downline hoses usually supplied in 30 m lengths, male/female quick connect couplings so they can be linked together to make up the desired length of hose.

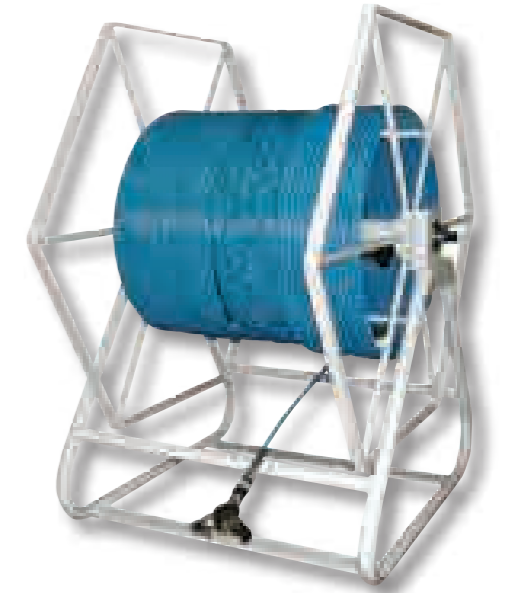
Maximum hose length capacity 500 m

| Subsea Tensioner Hoses | |
|--------------------------------|--|
| Order No. | DESCRIPTION |
| Subsea, without Locking Collar | |
| HL1M | 1 m Hose, 1,500 bar, CE, without locking collar (only stocked in Europe & Asia) |
| HL13M | 1.3 m Hose, 1,500 bar, CE, without locking collar (only stocked in the Americas) |
| HL3M | 3 m Hose, 1,500 bar, CE, without locking collar |
| HL5M | 5 m Hose, 1,500 bar, CE, without locking collar |
| HL8M | 8 m Hose, 1,500 bar, CE, without locking collar |
| HL10M | 10 m Hose, 1,500 bar, CE, without locking collar |
| Subsea down-line hose | |
| Order No. | DESCRIPTION |
| HL30M-DL | 30 m Hose, 1500 bar, CE, with locking collar, 1 x male + 1 x female coupler with locking collar. Used to link hoses together between hose reel and subsea work site. |

Additional lengths available upon request.

| | | |
|-------------|--|--|
| HPSTP150004 | | 2,000 bar; 30,000 psi gauge for HPUTP pumps |
| HHAMA15002 | | 1,500 Bar 3-Port Manifold Assembly: Used in Subsea hose arrangement to split single downline into two hoses which connect to the first two tensioners in the circuit. Can also be used to split a single feed hose to feed 2 tensioners. |

SUBSEA TENSION
1,500 bar/21,750 psi



Hose reel stand complete with tensioner down line for offshore equipment use.

| | | |
|---------|--|---|
| 2008548 | | Female Coupling: Quick-connect, push-in female coupling without locking collar. Used on 1,500 bar Subsea tensioner hoses. 6 1/4" Female Thread |
| 2001772 | | Male Coupling: Quick-connect, push-in male nipple. Used on 1,500 bar tensioners and pumps. 6 1/4" Female Thread |

Hoses come standard with recessed female coupler type (2008548). Flat Face couplers available upon request.

SPLITTERS & SPREADERS

3/8" COUPLERS

700 bar/10,000 psi



9764

| | | |
|---------------|--|---|
| 9040 9040E | | Gauge for 700 bar; 10,000 psi hand pumps. 9040 has psi as primary unit. 9040E has bar as primary unit. |
| 9042DG | | 700 bar, 10,000 psi gauge for torque wrench applications. Custom scale enables the following units to be displayed: lb-ft or Nm |

IJ100 HYDRAULIC HOSE ASSEMBLY (AMERICAS & ASIA)

No. 9764 – Hose assembly consisting of 9767 (6' hose), 1/4" I.D. polyurethane with 9798 hose half coupler and 9800 dust cap assembly. Complies to MHI Standard IJ100 (2:1 Burst).

CE HYDRAULIC HOSE ASSEMBLY (EUROPE)

No. 9764E – Hose assembly consisting of 9767E (2m hose), 6mm I.D. polyurethane with 9798 hose half coupler and 9800 dust cap assembly. Complies to CE Standards (4:1 Burst over Nominal pressure ratio).

Note: Not for EHN Nut Splitter. For topside EHN, see page 102. For Subsea EHN, see page 104.

| | | |
|-----------------------|--|---|
| 9670 | | Tee adapter. For installing gauge between pump and hose coupling. Has 1/4" and 3/8" NPTF female and 3/8" NPTF male ports. |
| 9799 | | Optional metal dust cap (hose half) |
| 9797 | | Optional metal dust cap (pump/tool half) |
| 9798 (male coupler) | | Male (hose) half coupler (with No. 9800 dust cap). 3/8" NPTF. |
| 9796 (female coupler) | | Female (pump/tool) half coupler (with No. 9800 dust cap). 3/8" NPTF. |
| 9800 | | Dust cap for male or female 3/8" NPTF half couplers. |

STANDARD HYDRAULIC OIL

- For dependable performance of all your hydraulic pumps and cylinders.
- Contains foam suppressant additives and has a high viscosity index.

FLAME-OUT® 220 FIRE RESISTANT HYDRAULIC FLUID*

- Contains anti-rust, anti-foam and anti-sludge additives.
- Provides fire resistant protection.

(Note: Will burn if heat source is extreme enough. Will not, however, propagate the flame and is self-extinguishing when there is no ignition source.)
- Provides maximum lubrication and heat transfer.
- Offers a wider operating temperature range.
- No need to change seals in your equipment. Just drain the standard oil and replace it with Flame-Out® 220.

LOW TEMPERATURE OIL

Provides smooth, reliable operation in the coldest climate conditions.

HYDRAULIC FLUIDS

Standard, Flame Out®, Biodegradable and Low Temperature

BIODEGRADABLE HYDRAULIC FLUID

- Biodegradable, non-toxic fluid withstands moderate to severe operating conditions; provides excellent protection against rust.
 - Offers superior anti-wear properties, has excellent multi-metal compatibility.
- Developed to meet stringent performance requirements and satisfy growing environmental needs for hydraulic fluids which are readily biodegradable and non-toxic. Depending on the contamination or degradation levels which might be present in used fluid, small amounts of this substance, if spilled, will not affect ground water or the environment. This fluid has been tested against EPA 560/6-82-003 and OECD 301 for biodegradability, and toxicity has been tested against EPA 560/6-82-002 and OECD 203: 1-12. Not recommended for operation in temperatures below 20°F (-7°C) or above 160°F (71°C). Recommended storage temperatures not below -10°F (-23°C) or above 170°F (77°C).

Specifications and Dimensional Data

| Description | Grade (ASTM) | Specific Gravity @ 60°F (16°C) | Color (ASTM) | Flash Point | | Fire Point | | Pour Point | | Viscosity | | | Foam Test (ASTM) |
|---------------|--------------|--------------------------------|--------------|-------------|-----|------------|-----|------------|-----|--------------------|--------------------|------------|------------------|
| | | | | °F | °C | °F | °C | °F | °C | SUS @ 100°F (38°C) | SUS @ 210°F (99°C) | Index min. | |
| Standard Oil | 215 | .88 | 2.0 | 400 | 204 | 430 | 221 | -30 | -34 | 215 | 48 | 100 | Pass |
| Flame-Out® | 220 | .91 | Light Amber | 500 | 260 | 550 | 288 | -15 | -26 | 220 | 55 | 140 | Pass |
| Biodegradable | - | .92 | 2.0 | 432 | 224 | NA* | NA* | -22 | 30 | 183 | 53 | 213 | Pass |
| Low Temp. | - | .87 | 6.5 (Red) | 356 | 180 | 399 | 204 | -48 | 45 | 183 | 52 | 190 | Pass |

Ordering Information

| Order No. | Description | Quantity |
|-----------|---------------|-------------------------------|
| 9636 | Standard Oil | 1 qt. (57 cu. in.) 0.9l |
| 9637 | Standard Oil | 1 gal. (231 cu. in.) 3.8l |
| 9638 | Standard Oil | 2-1/2 gal. (577 cu. in.) 9.5l |
| 9616 | Standard Oil | 55 gal. 208l |
| 9639 | Flame-Out® | 1 gal. (231 cu. in.) 3.8l |
| 9640 | Flame-Out® | 2-1/2 gal. (577 cu. in.) 9.5l |
| 9645 | Biodegradable | 1 gal. (231 cu. in.) 3.8l |
| 9646 | Biodegradable | 2-1/2 gal. (577 cu. in.) 9.5l |
| 9647 | Low Temp. | 1 gal. (231 cu. in.) 3.8l |



See page 114 for gauge calibration services.

For additional technical information or to order a Material Safety Data Sheet call 1-800-477-8326 or go to www.spxboltingsystems.com.

FLANGE MANAGEMENT SYSTEMS INTRODUCTION

FLANGEPRO provides a fully featured Flange Management System, maximizing the control of the Flange Register, allowing comprehensive and consistent operation of all flange break, make-up and inspection processes or commissioning, operations and turnarounds/shutdown applications.

WHY IS FLANGE INTEGRITY SO IMPORTANT?

Flange Management Systems can help address elements of SEMS, SEMS II, and RP 75, such as:

- Maintaining key information on flanged joints, leak testing, and controlled bolting bolt load calculations and methods.
- Documentation of operating procedures for controlled bolting processes.
- Help maintain mechanical integrity of piping assets.

Flange Management Systems can help address KP4 requirements:

- Help track flange records for ageing assets and maintain a documented record of their condition.

Flange Management Systems provides a system to help manage hydrocarbon-containing equipment from experiencing a hydrocarbon release.



FLANGE INTEGRITY MANAGEMENT SYSTEMS



A **3 year** study on the impact of leaking pipe flanges showed a major refinery averaged **630** leaks per year resulting in **380,000** pounds of volatile organic compounds (VOC) being released into the atmosphere. Estimated monetary losses from fines, materials, and labor charges averaged **\$440K** per year (not including production losses)*.

What's it worth to help prevent a catastrophic event?

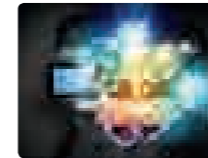
- The Deepwater Horizon accident resulted in the loss of eleven lives and the overall cost was several billion dollars.
- The Piper Alpha accident cost the loss of 167 lives and changed the face of the North Sea O&G industry entirely.
- A high consequence event that occurred in a California refinery which resulted when a 4inch 300# gasket failed due to improper tightening. The refinery reported that consequential damages due to production loss, fines, and rework were in excess of \$500M*.

Our Flange Management Systems helps to:

- Mitigate & Avoid high consequence events
- Extend the life of an asset
- Maintain expected performance
- Manage Risk

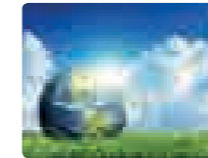
(* Source: 2014 AFPM Reliability & Maintenance Conference)

FLANGE MANAGEMENT SYSTEMS PRODUCT FEATURES



MULTIPLE PROJECTS

A centralized repository to capture, store and visualize multiple project or asset related information.



CLOUD PLATFORM

Internet-based global delivery of integrity systems to support both regional and international project execution and governance.



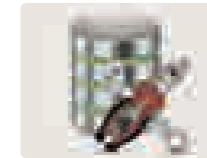
MARKUP TOOL

This tool combines powerful document editing, markup and collaboration technology and when combined with our intelligent workflow system a comprehensive visualization tool.



ASSET IDENTIFICATION

Rapid operations using barcoding and RFID for identification of physical and paper assets to automate business processes and improve accuracy.



CONFIGURABILITY /FLEXIBILITY

Our software is very flexible and can be extensively customized to mirror your organizational process and procedures.



ISO 27001

Our Data Centers are all ISO 27001 and 9001 accredited and operated at tier 3+ equivalent levels, ensuring you receive the highest standard of service.

| Product Features | Personal | Professional | Enterprise |
|--|----------|--------------|------------|
| Core Features | | | |
| Cloud-based service with full resilience | Standard | Standard | Standard |
| Adviser Bolt Load Calculation Tool | Standard | Standard | Standard |
| Flange Management System | Standard | Standard | Standard |
| Inspection & Leak Test Planning System | Standard | Standard | Standard |
| Configurable Integrity Management Platform | Standard | Standard | Standard |
| All Upgrades / Software Maintenance | Standard | Standard | Standard |
| Easy Data Out Policy | Standard | Standard | Standard |
| Annual Software Training & Integrity Awareness | | Standard | Standard |
| Priority Access to Technical Assurance Centre | | Limited | Standard |
| Collaboration | | | |
| Multi-user collaboration | | Standard | Standard |
| Offline / Desktop Application | | | Standard |
| Hardware Integrity Kit Rental | Optional | Optional | Optional |
| Floating License Option | | | Optional |
| Named Users to Floating License Max Ratio | | 1:1 | 1:2 |
| Back to Back License Option | | | 1:1 |
| Feature Packs | | Optional | Standard |
| TAR - Project Management Module | | Optional | Standard |
| TAG - Tag production and workflow system | | Optional | Standard |
| MARKUP - Document Markup System | | Optional | Standard |
| LINKSYNC - Integration Middleware | | Optional | Standard |

Due to ongoing development work the product features may change

FLANGE MANAGEMENT SYSTEMS

FLANGEPRO BENEFITS



FLANGEPRO

FlangePro provides a fully featured Flange Management System, maximizing the control of the flange register, allowing comprehensive and consistent operation of all flange break, make-up and inspection processes for commissioning, operations and turnarounds/shutdown applications.

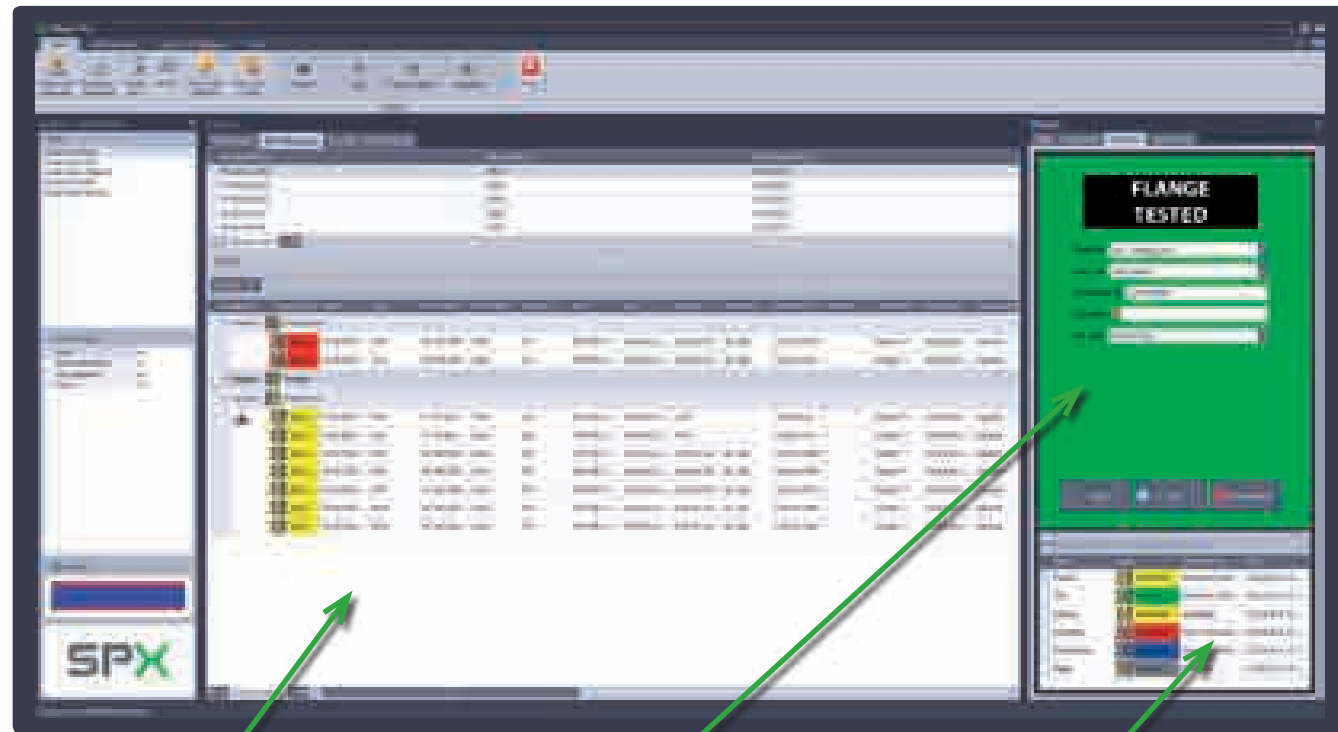
Built upon our unique and highly flexible Integrity Management System platform, FlangePro can be used in many different fields, project phases (Pre-Bid, On Site Work, Pre-Work and Completion Handover) and for many different service lines and activities, such as;

- Flange Management
- Equipment & Inventory Management
- Personnel management
- Service, Inspection and Process Management
- Shutdown Project Management
- Pre-Commissioning Completions Management
- Leak Test planning
- On-demand version allows licensing for specific short term projects

Product Features:

- Multiple Projects
- Secure Cloud Platform
- Asset Identification
- Configurability/Flexibility
- Markup tool

Visit spxboltingsystems.com for more details



Sort workpacks/activities by status for ease of management

Visual workflow status matching any tagging process adopted

Full history of workflow/activities is recorded against the safety critical artifact and the activity pack it is held on.

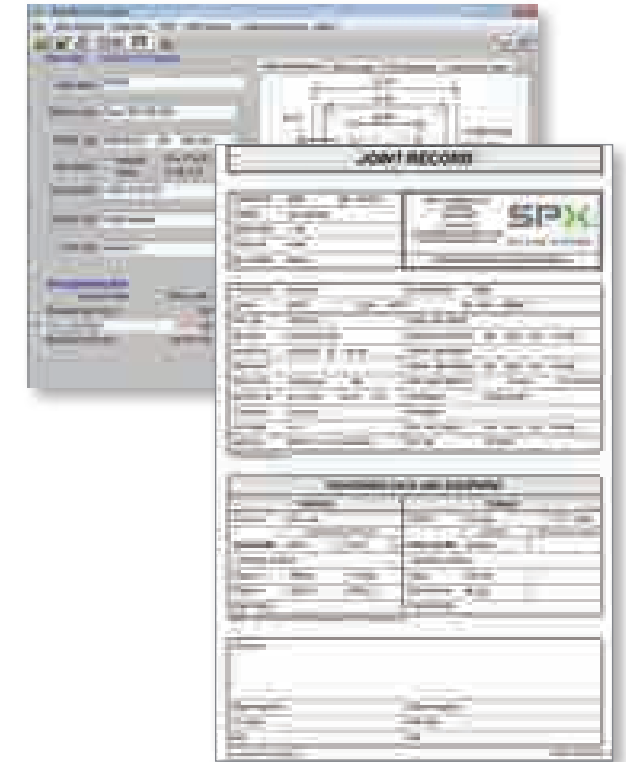
ADVISER BOLT LOAD CALCULATOR

The adviser software considers many years of bolt working experience, where data has been channeled into a single computer software program. Bolt tightening data, procedures and recommendations for standard, non-standard and specialty joints makes adviser an invaluable tool to any industry.

The Adviser software package includes:

- Tightening data for BS1560, MSS SP44, API 6A and 17D flanged joints.
- Encompasses standard flanges, wafer check valves, spade and spacers, and swivel flange assemblies.
- Torque data and tensioning tool pressures for both Subsea and Topsides applications.
- Bolt extension calculations.
- Tightening procedures and Torque sequences.
- Joint specific recommendations for improved integrity.
- Large database of bolt materials.
- Large database of bolt lubricants.
- Dimensional data of flanges.
- Recommended bolt lengths.
- Simple user interface with 'Windows' look and feel.
- New bolt materials and lubricants can be added!

BOLT LOAD CALCULATOR ADVISER



Available on the App Store Visit the Apple AppStore for mobile applications



TRAINING

SPX FLOW Bolting Systems offer a range of courses covering joint integrity and flange management to industry recognized standards. All of our instructors have many years' experience in the joint integrity/ flange management sector most of which have spent considerable time in a hands on role actually doing the job that they are now training others to do. Our instructors have nationally recognized teaching qualifications which reinforce the quality of the training programs that we offer.

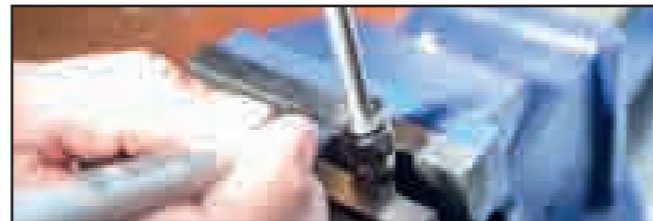
Our courses contain a mix of both theoretical and practical elements providing a positive learning experience for the learner. We have purpose built training facilities around the globe which house the latest in flange management tooling and associated equipment and in which learners are encouraged by our Instructors to embrace all aspects of Health and Safety and to



strive for a right first time approach to all joint integrity applications. Courses can be delivered in a variety of formats including:

- Industry Approved training
- Well established in-house programs
- Bespoke options tailored to a client's requirements, such as ASME PCC-1-2013

SPX FLOW Bolting Systems are an ECITB and API approved training provider.



ECITB APPROVED TRAINING

The ECITB has approved the following specific courses which are derived from the new Mechanical Joint Integrity and Small Bore Tubing Technical Training Standards.

- MJ110 - Hand Torque Bolted Connection Techniques – one day duration
- MJ118 - Hydraulically Tension Bolted Connection Techniques – one day duration
- MJ119 - Hydraulically Torque Bolted Connection Techniques – 1.5 days duration
- MJ1 10, 18 & 19 - Hydraulically Torque and Tension Bolted Connection Techniques – 2.5 days duration
- SBT01 Assemble and Install Small Bore Tubing with Twin Ferrule Mechanical Grip Fittings – 2 days duration

TECHNICAL TESTS

Technical Testing with an associated ECITB certificate of achievement plays a key role in validating an individual's skill, ability and job knowledge in a specific task area. Each test consists of a knowledge test and practical activity test against identified test criteria.

- There are five ECITB approved Technical Tests covering mechanical joint integrity and two covering Small Bore Tubing
- TMJI10 Dismantle, Assemble and Hand Torque Flanged Joints

- TMJI11 Dismantle, Assemble and Hand Torque Clamp Connectors
- TMJI18 Dismantle, Assemble and Tensioning Bolted Connections (Hydraulic Tensioning)
- TMJI 19 Dismantle, Assemble and Hydraulically Torque Flanged Joints
- TMJI 20 Dismantle, Assemble and Hydraulically Torque Clamp Connector Joints
- TSBT 01 Assemble and Install small bore tubing assemblies- Twin Ferrule
- TSBT 02 Disassemble and reinstall small bore tubing assemblies

ECITB courses and technical tests can be delivered at:

- SPX FLOW UK ECITB approved training and testing centers
- SPX FLOW Houston, TX, USA ECITB approved training and testing centers
- SPX FLOW Global Training facilities – subject to approval via SPX FLOW Training UK and ECITB
- Client Site UK – subject to approval via SPX FLOW Training UK.
- Client Site Global - subject to approval via SPX FLOW Training UK and ECITB



AMERICAN PETROLEUM INSTITUTE - APPROVED TRAINING

As an API-U approved training provider SPX FLOW can offer a two day course covering the assembly, tightening and disassembly of bolted connections. This course includes in depth practical instruction on the safe and effective use of both hand and hydraulic bolt tightening equipment.

This SPX FLOW API approved training course can be delivered at:

- SPX FLOW global training facilities
- Client Site Global – subject to approval via SPX FLOW Training UK.

API-U is dedicated to providing excellence in petroleum industry training. Because API has access to the largest pool of subject experts in the industry, API-U programs are taught by the best trainers who utilize today's innovative methods. The practical knowledge gained from API-U training enables participants to maintain professional competency.



ADDITIONAL COURSE OFFERINGS

- SPX FLOW ADVISOR
 - controlled bolting software
- SPX FLOW FLANGEPRO
 - joint monitoring software

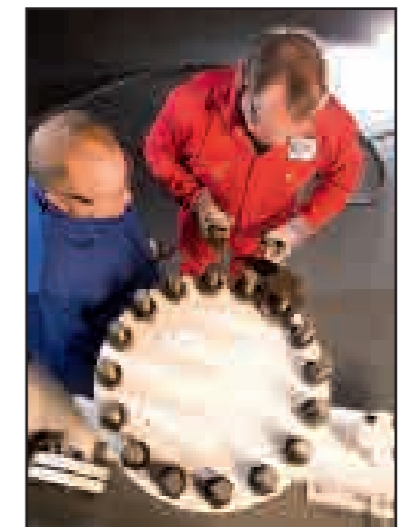
Service and Maintenance of SPX FLOW products



IOSH Managing Safely
IOSH Working Safely

Manual Handling

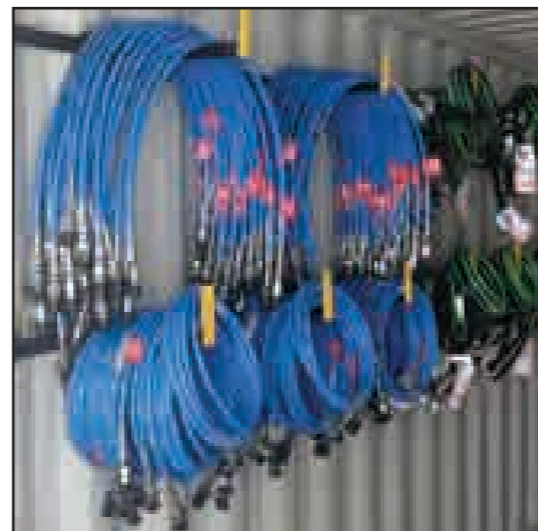
- Level 2 Award in Emergency First Aid at Work - UK
- Level 3 Award in First Aid at Work – UK
- Level 2 Award in Paediatric First Aid – UK
- Level 2 Award in CPR and AED - UK



RENTAL, CALIBRATION & SERVICE CENTERS

SPX FLOW Rental Service Centers offer full range of hydraulic torque wrenches, topside tensioners, subsea tensioners, nut splitters, pump units and ancillary equipment all available 24/7 to meet our customers needs.

All SPX FLOW Bolting Systems Service Centers offer calibration services for all hydraulic torque wrenches, torque pump units and tensioner pump units. Please contact your local SPX FLOW Service Center for details and pricing.



HOUSTON, TEXAS

- Located in Pasadena, TX near the O&G, Refinery and Petrochemical market
- Full Rental Inventory
- Training Facilities
- Calibration
- Repair
- 24/7 Availability



ABERDEEN, SCOTLAND

- Near key North Sea Offshore customers
- Rental Inventory
- Training Facilities



PERTH, AUSTRALIA

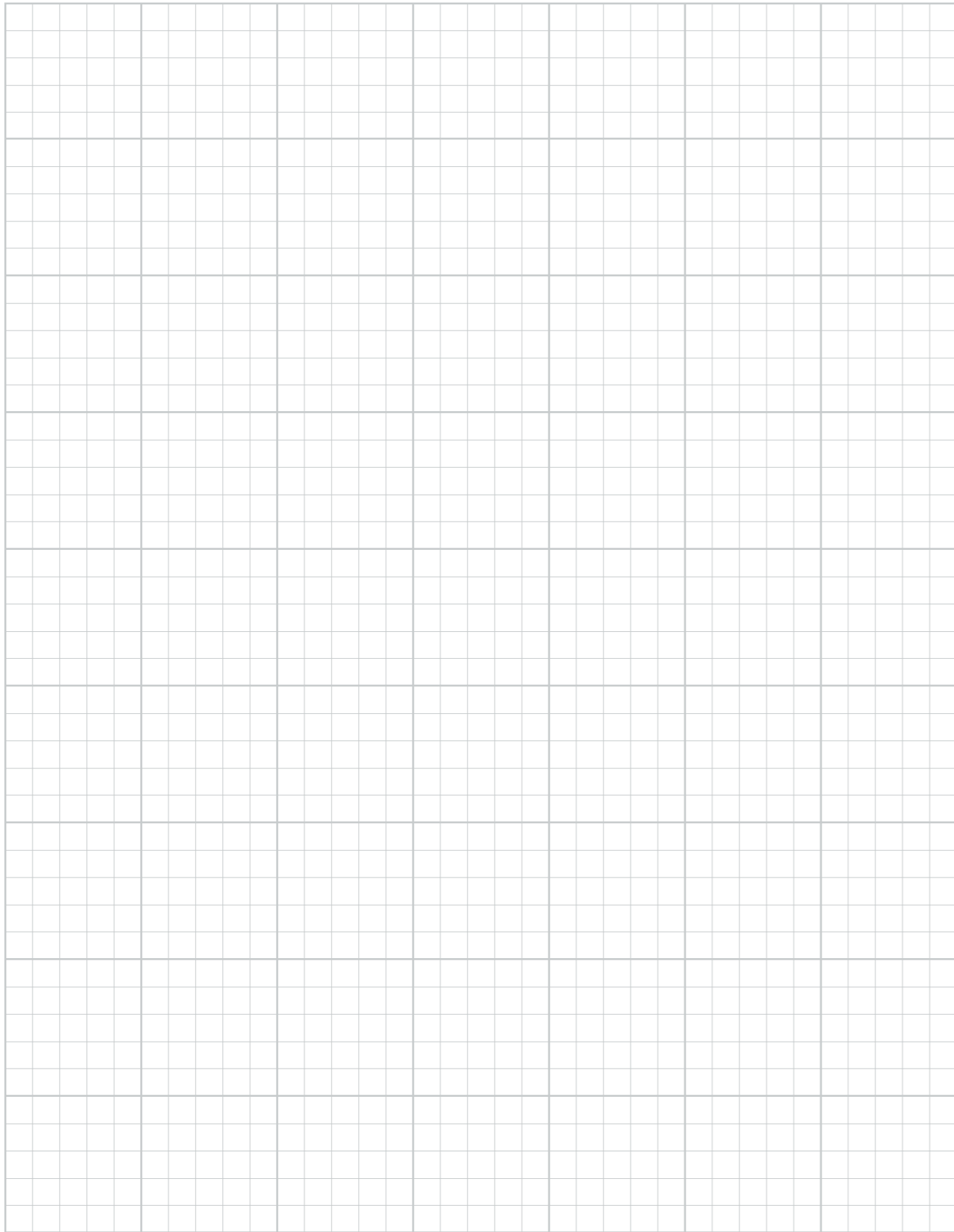
- Serves SE Asia customers
- Rental Inventory
- Training Facilities



OTHER LOCATIONS

- Baton Rouge, LA
- Ashington, UK (Center of Excellence)
- Egelshoven, Netherlands
- Singapore
- Corpus Christi, TX

RESOURCES



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MEASUREMENTS / SPECIFICATIONS

Conversion Formulas

Decimal & Millimeter Equivalents

| | DECIMALS | MILLIMETERS | | DECIMALS | MILLIMETERS |
|-------|----------|-------------|-------|----------|-------------|
| 1/64 | .015625 | 0.397 | 33/64 | .515625 | 13.097 |
| 1/32 | .03125 | 0.794 | 17/32 | .53125 | 13.494 |
| 3/64 | .046875 | 1.191 | 35/64 | .546875 | 13.891 |
| 1/16 | .0625 | 1.588 | 9/16 | .5625 | 14.288 |
| 5/64 | .078125 | 1.984 | 37/64 | .578125 | 14.684 |
| 3/32 | .09375 | 2.381 | 19/32 | .59375 | 15.081 |
| 7/64 | .109375 | 2.778 | 39/64 | .609375 | 15.478 |
| 1/8 | .1250 | 3.175 | 5/8 | .6250 | 15.875 |
| 9/64 | .140625 | 3.572 | 41/64 | .640625 | 16.272 |
| 5/32 | .15625 | 3.969 | 21/32 | .65625 | 16.669 |
| 11/64 | .171875 | 4.366 | 43/64 | .671875 | 17.066 |
| 3/16 | .1875 | 4.763 | 11/16 | .6875 | 17.463 |
| 13/64 | .203125 | 5.159 | 45/64 | .703125 | 17.859 |
| 7/32 | .21875 | 5.556 | 23/32 | .71875 | 18.256 |
| 15/64 | .234375 | 5.953 | 47/64 | .734375 | 18.653 |
| 1/4 | .2500 | 6.350 | 3/4 | .7500 | 19.050 |
| 17/64 | .265625 | 6.747 | 49/64 | .765625 | 19.447 |
| 9/32 | .28125 | 7.144 | 25/32 | .78125 | 19.844 |
| 19/64 | .296875 | 7.541 | 51/64 | .796875 | 20.241 |
| 5/16 | .3125 | 7.938 | 13/16 | .8125 | 20.638 |
| 21/64 | .328125 | 8.334 | 53/64 | .828125 | 21.034 |
| 11/32 | .34375 | 8.731 | 27/32 | .84375 | 21.431 |
| 23/64 | .359375 | 9.128 | 55/64 | .859375 | 21.828 |
| 3/8 | .3750 | 9.525 | 7/8 | .8750 | 22.225 |
| 25/64 | .390625 | 9.922 | 57/64 | .890625 | 22.622 |
| 13/32 | .40625 | 10.319 | 29/32 | .90625 | 23.019 |
| 27/64 | .421875 | 10.716 | 59/64 | .921875 | 23.416 |
| 7/16 | .4375 | 11.113 | 15/16 | .9375 | 23.813 |
| 29/64 | .453125 | 11.509 | 61/64 | .953125 | 24.209 |
| 15/32 | .46875 | 11.906 | 31/32 | .96875 | 24.606 |
| 31/64 | .484375 | 12.303 | 63/64 | .984375 | 25.003 |
| 1/2 | .5000 | 12.700 | 1 | 1.000 | 25.400 |

1 mm = .03937"
.001" = .0254 mm

SI* Conversion Formulas

APPROXIMATE CONVERSION

| MULTIPLY SI* UNIT | BY CONVERSION FACTOR | TO GET OR MULTIPLY NON-SI UNIT | BY CONVERSION FACTOR | TO GET SI* UNIT |
|---|----------------------|--------------------------------|----------------------|----------------------------------|
| LENGTH | | | | |
| Millimeter (mm) | X 0.03937 | = inch | X 25.4 | = mm (1 inch = 25.4 mm exactly) |
| Centimeter (cm) 10 mm | X 0.3937 | = inch | X 2.54 | = cm |
| Meter (m) 1000 mm | X 3.28 | = foot | X 0.305 | = m |
| meter (m) | X 1.09 | = yard | X 0.914 | = m |
| kilometer (km) 1000 m | X 0.62 | = mile | X 1.61 | = km |
| AREA | | | | |
| millimeter ² (mm ²) | X 0.00155 | = inch ² | X 645 | = mm ² |
| centimeter ² (cm ²) | X 0.155 | = inch ² | X 6.45 | = cm ² |
| meter ² (m ²) | X 10.8 | = foot ² | X 0.0929 | = m ² |
| meter ² (m ²) | X 1.2 | = yard ² | X 0.836 | = m ² |
| hectare (ha) 10,000 m ² | X 2.47 | = acre | X 0.405 | = ha |
| kilometer ² (km ²) | X 0.39 | = mile ² | X 2.59 | = km ² |
| VOLUME | | | | |
| centimeter ³ (cm ³) | X 0.061 | = inch ³ | X 16.4 | = cm ³ |
| liter (L) | X 61 | = inch ³ | X 0.016 | = L |
| milliliter (mL) | X 0.034 | = oz-liq | X 29.6 | = mL (1 mL = 1 cm ³) |
| liter (L) 1000 mL | X 1.06 | = quart | X 0.946 | = L |
| liter (L) | X 0.26 | = Gallon | X 3.79 | = L |
| meter ³ (m ³) 1000 L | X 1.3 | = yard ³ | X 0.76 | = m ³ |
| MASS | | | | |
| Gram (g) | X 0.035 | = ounce | X 28.3 | = g |
| kilogram (kg) 1000 g | X 2.2 | = pound | X 0.454 | = kg |
| metric ton (t) 1000 kg | X 1.1 | = ton (short) | X 0.907 | = t |
| FORCE (N = kg • m/s²) | | | | |
| Newton (N) | X 0.225 | = pound | X 4.45 | = N |
| kilonewton (kN) | X 225 | = pound | X 0.00445 | = kN |
| TORQUE | | | | |
| newton meter (Nm) | X 8.9 | = lb. in. | X 0.113 | = Nm |
| newton meter (Nm) | X 0.74 | = lb. ft. | X 1.36 | = Nm |
| PRESSURE (Pa = N/m²) | | | | |
| kilopascal (kPa) | X 4.0 | = in. H ₂ O | X 0.249 | = kPa |
| kilopascal (kPa) | X 0.30 | = in. Hg | X 3.38 | = kPa |
| kilopascal (kPa) | X 0.145 | = psi | X 6.89 | = kPa |
| megapascal (MPa) | X 145 | = psi | X 0.00689 | = MPa |
| bar | X 14.5 | = psi | X 0.0680 | = bar |
| POWER (w = J/s) | | | | |
| kilowatt (kw) | X 1.34 | = hp | X 0.746 | = kw |
| kilowatt (kw) | X 0.948 | = Btu/s | X 1.055 | = kw |
| watt (w) | X 0.74 | = ft. lb/s | X 1.36 | = w |
| TEMPERATURE | | | | |
| $^{\circ}\text{C} = (^{\circ}\text{F} - 32) \div 1.8$ $^{\circ}\text{F} = (^{\circ}\text{C} \times 1.8) + 32$ | | | | |
| FLOW | | | | |
| cu cm/min | X 0.061 | = cu in/min | X 16.4 | = cu cm/min |
| liters/min | X 0.2642 | = GPM | X 3.785 | = liters/min |

* System International (Modern Metric System)

MEASUREMENTS / SPECIFICATIONS
Conversion Formulas

MEASUREMENTS / SPECIFICATIONS
Conversion Formulas

**TWSD Square Drive Hydraulic Torque Wrench
Pressure - Torque Conversion Chart**

| Pump Pressure | | Torque Output | | | | | | | | | |
|---------------|-----|---------------|-------|--------|-------|--------|-------|--------|--------|--------|--------|
| | | TWS01 | | TWS03 | | TWS06 | | TWS011 | | TWS025 | |
| PSI | BAR | lb-ft. | Nm | lb-ft. | Nm | lb-ft. | Nm | lb-ft. | Nm | lb-ft. | Nm |
| 1,200 | 83 | 156 | 211 | 368 | 499 | 722 | 979 | 1,313 | 1,779 | 2,940 | 3,984 |
| 1,400 | 97 | 182 | 247 | 430 | 582 | 843 | 1,142 | 1,532 | 2,075 | 3,430 | 4,648 |
| 1,600 | 110 | 208 | 282 | 491 | 666 | 963 | 1,305 | 1,750 | 2,372 | 3,920 | 5,312 |
| 1,800 | 124 | 234 | 317 | 553 | 749 | 1,084 | 1,468 | 1,969 | 2,668 | 4,410 | 5,976 |
| 2,000 | 138 | 260 | 352 | 614 | 832 | 1,204 | 1,631 | 2,188 | 2,965 | 4,900 | 6,640 |
| 2,200 | 152 | 286 | 388 | 675 | 915 | 1,324 | 1,795 | 2,407 | 3,261 | 5,390 | 7,304 |
| 2,400 | 165 | 312 | 423 | 737 | 998 | 1,445 | 1,958 | 2,626 | 3,558 | 5,880 | 7,967 |
| 2,600 | 179 | 338 | 458 | 798 | 1,082 | 1,565 | 2,121 | 2,844 | 3,854 | 6,370 | 8,631 |
| 2,800 | 193 | 364 | 493 | 860 | 1,165 | 1,686 | 2,284 | 3,063 | 4,151 | 6,860 | 9,295 |
| 3,000 | 207 | 390 | 528 | 921 | 1,248 | 1,806 | 2,447 | 3,282 | 4,447 | 7,350 | 9,959 |
| 3,200 | 221 | 416 | 564 | 982 | 1,331 | 1,926 | 2,610 | 3,501 | 4,744 | 7,840 | 10,623 |
| 3,400 | 234 | 442 | 599 | 1,044 | 1,414 | 2,047 | 2,773 | 3,720 | 5,040 | 8,330 | 11,287 |
| 3,600 | 248 | 468 | 634 | 1,105 | 1,498 | 2,167 | 2,937 | 3,938 | 5,337 | 8,820 | 11,951 |
| 3,800 | 262 | 494 | 669 | 1,167 | 1,581 | 2,288 | 3,100 | 4,157 | 5,633 | 9,310 | 12,615 |
| 4,000 | 276 | 520 | 705 | 1,228 | 1,664 | 2,408 | 3,263 | 4,376 | 5,930 | 9,800 | 13,279 |
| 4,200 | 290 | 546 | 740 | 1,289 | 1,747 | 2,528 | 3,426 | 4,595 | 6,226 | 10,290 | 13,943 |
| 4,400 | 303 | 572 | 775 | 1,351 | 1,830 | 2,649 | 3,589 | 4,814 | 6,522 | 10,780 | 14,607 |
| 4,600 | 317 | 598 | 810 | 1,412 | 1,914 | 2,769 | 3,752 | 5,032 | 6,819 | 11,270 | 15,271 |
| 4,800 | 331 | 624 | 846 | 1,474 | 1,997 | 2,890 | 3,915 | 5,251 | 7,115 | 11,760 | 15,935 |
| 5,000 | 345 | 650 | 881 | 1,535 | 2,080 | 3,010 | 4,079 | 5,470 | 7,412 | 12,250 | 16,599 |
| 5,200 | 359 | 676 | 916 | 1,596 | 2,163 | 3,130 | 4,242 | 5,689 | 7,708 | 12,740 | 17,263 |
| 5,400 | 372 | 702 | 951 | 1,658 | 2,246 | 3,251 | 4,405 | 5,908 | 8,005 | 13,230 | 17,927 |
| 5,600 | 386 | 728 | 986 | 1,719 | 2,330 | 3,371 | 4,568 | 6,126 | 8,301 | 13,720 | 18,591 |
| 5,800 | 400 | 754 | 1,022 | 1,781 | 2,413 | 3,492 | 4,731 | 6,345 | 8,598 | 14,210 | 19,255 |
| 6,000 | 414 | 780 | 1,057 | 1,842 | 2,496 | 3,612 | 4,894 | 6,564 | 8,894 | 14,700 | 19,919 |
| 6,200 | 427 | 806 | 1,092 | 1,903 | 2,579 | 3,732 | 5,057 | 6,783 | 9,191 | 15,190 | 20,583 |
| 6,400 | 441 | 832 | 1,127 | 1,965 | 2,662 | 3,853 | 5,221 | 7,002 | 9,487 | 15,680 | 21,247 |
| 6,600 | 455 | 858 | 1,163 | 2,026 | 2,746 | 3,973 | 5,384 | 7,220 | 9,784 | 16,170 | 21,911 |
| 6,800 | 469 | 884 | 1,198 | 2,088 | 2,829 | 4,094 | 5,547 | 7,439 | 10,080 | 16,660 | 22,575 |
| 7,000 | 483 | 910 | 1,233 | 2,149 | 2,912 | 4,214 | 5,710 | 7,658 | 10,377 | 17,150 | 23,238 |
| 7,200 | 496 | 936 | 1,268 | 2,210 | 2,995 | 4,334 | 5,873 | 7,877 | 10,673 | 17,640 | 23,902 |
| 7,400 | 510 | 962 | 1,304 | 2,272 | 3,078 | 4,455 | 6,036 | 8,096 | 10,970 | 18,130 | 24,566 |
| 7,600 | 524 | 988 | 1,339 | 2,333 | 3,162 | 4,575 | 6,199 | 8,314 | 11,266 | 18,620 | 25,230 |
| 7,800 | 538 | 1,014 | 1,374 | 2,395 | 3,245 | 4,696 | 6,363 | 8,533 | 11,563 | 19,110 | 25,894 |
| 8,000 | 552 | 1,040 | 1,409 | 2,456 | 3,328 | 4,816 | 6,526 | 8,752 | 11,859 | 19,600 | 26,558 |
| 8,200 | 565 | 1,066 | 1,444 | 2,517 | 3,411 | 4,936 | 6,689 | 8,971 | 12,156 | 20,090 | 27,222 |
| 8,400 | 579 | 1,092 | 1,480 | 2,579 | 3,494 | 5,057 | 6,852 | 9,190 | 12,452 | 20,580 | 27,886 |
| 8,600 | 593 | 1,118 | 1,515 | 2,640 | 3,578 | 5,177 | 7,015 | 9,408 | 12,749 | 21,070 | 28,550 |
| 8,800 | 607 | 1,144 | 1,550 | 2,702 | 3,661 | 5,298 | 7,178 | 9,627 | 13,045 | 21,560 | 29,214 |
| 9,000 | 621 | 1,170 | 1,585 | 2,763 | 3,744 | 5,418 | 7,341 | 9,846 | 13,341 | 22,050 | 29,878 |
| 9,200 | 634 | 1,196 | 1,621 | 2,824 | 3,827 | 5,538 | 7,505 | 10,065 | 13,638 | 22,540 | 30,542 |
| 9,400 | 648 | 1,222 | 1,656 | 2,886 | 3,910 | 5,659 | 7,668 | 10,284 | 13,934 | 23,030 | 31,206 |
| 9,600 | 662 | 1,248 | 1,691 | 2,947 | 3,993 | 5,779 | 7,831 | 10,502 | 14,231 | 23,520 | 31,870 |
| 9,800 | 676 | 1,274 | 1,726 | 3,009 | 4,077 | 5,900 | 7,994 | 10,721 | 14,527 | 24,010 | 32,534 |
| 10,000 | 689 | 1,300 | 1,762 | 3,070 | 4,160 | 6,020 | 8,157 | 10,940 | 14,824 | 24,500 | 33,198 |
| 10,153 | 700 | 1,320 | 1,789 | 3,117 | 4,223 | 6,112 | 8,282 | 11,107 | 15,050 | 24,874 | 33,705 |

**TWLC Low Clearance Hydraulic Torque Wrench
Pressure - Torque Conversion Chart**

| Pump Pressure | | Torque Output | | | | | | | | | |
|---------------|-----|---------------|-------|--------|-------|--------|--------|--------|--------|--------|--------|
| | | TWLC2 | | TWLC4 | | TWLC8 | | TWLC15 | | TWLC30 | |
| PSI | BAR | lb-ft. | Nm | lb-ft. | Nm | lb-ft. | Nm | lb-ft. | Nm | lb-ft. | Nm |
| 1,200 | 83 | 189 | 256 | 477 | 646 | 954 | 1,293 | 1,782 | 2,415 | 3,456 | 4,683 |
| 1,400 | 97 | 221 | 299 | 557 | 754 | 1,113 | 1,508 | 2,079 | 2,817 | 4,032 | 5,463 |
| 1,600 | 110 | 252 | 341 | 636 | 862 | 1,272 | 1,724 | 2,376 | 3,220 | 4,608 | 6,244 |
| 1,800 | 124 | 284 | 384 | 716 | 970 | 1,431 | 1,939 | 2,673 | 3,622 | 5,184 | 7,024 |
| 2,000 | 138 | 315 | 427 | 795 | 1,077 | 1,590 | 2,154 | 2,970 | 4,024 | 5,760 | 7,805 |
| 2,200 | 152 | 347 | 470 | 875 | 1,185 | 1,749 | 2,370 | 3,267 | 4,427 | 6,336 | 8,585 |
| 2,400 | 165 | 378 | 512 | 954 | 1,293 | 1,908 | 2,585 | 3,564 | 4,829 | 6,912 | 9,366 |
| 2,600 | 179 | 410 | 555 | 1,034 | 1,400 | 2,067 | 2,801 | 3,861 | 5,232 | 7,488 | 10,146 |
| 2,800 | 193 | 441 | 598 | 1,113 | 1,508 | 2,226 | 3,016 | 4,158 | 5,634 | 8,064 | 10,927 |
| 3,000 | 207 | 473 | 640 | 1,193 | 1,616 | 2,385 | 3,232 | 4,455 | 6,037 | 8,640 | 11,707 |
| 3,200 | 221 | 504 | 683 | 1,272 | 1,724 | 2,544 | 3,447 | 4,752 | 6,439 | 9,216 | 12,488 |
| 3,400 | 234 | 536 | 726 | 1,352 | 1,831 | 2,703 | 3,663 | 5,049 | 6,841 | 9,792 | 13,268 |
| 3,600 | 248 | 567 | 768 | 1,431 | 1,939 | 2,862 | 3,878 | 5,346 | 7,244 | 10,368 | 14,049 |
| 3,800 | 262 | 599 | 811 | 1,511 | 2,047 | 3,021 | 4,093 | 5,643 | 7,646 | 10,944 | 14,829 |
| 4,000 | 276 | 630 | 854 | 1,590 | 2,154 | 3,180 | 4,309 | 5,940 | 8,049 | 11,520 | 15,610 |
| 4,200 | 290 | 662 | 896 | 1,670 | 2,262 | 3,339 | 4,524 | 6,237 | 8,451 | 12,096 | 16,390 |
| 4,400 | 303 | 693 | 939 | 1,749 | 2,370 | 3,498 | 4,740 | 6,534 | 8,854 | 12,672 | 17,171 |
| 4,600 | 317 | 725 | 982 | 1,829 | 2,478 | 3,657 | 4,955 | 6,831 | 9,256 | 13,248 | 17,951 |
| 4,800 | 331 | 756 | 1,024 | 1,908 | 2,585 | 3,816 | 5,171 | 7,128 | 9,659 | 13,824 | 18,732 |
| 5,000 | 345 | 788 | 1,067 | 1,988 | 2,693 | 3,975 | 5,386 | 7,425 | 10,061 | 14,400 | 19,512 |
| 5,200 | 359 | 819 | 1,110 | 2,067 | 2,801 | 4,134 | 5,602 | 7,722 | 10,463 | 14,976 | 20,293 |
| 5,400 | 372 | 851 | 1,152 | 2,147 | 2,909 | 4,293 | 5,817 | 8,019 | 10,866 | 15,552 | 21,073 |
| 5,600 | 386 | 882 | 1,195 | 2,226 | 3,016 | 4,452 | 6,033 | 8,316 | 11,268 | 16,128 | 21,854 |
| 5,800 | 400 | 914 | 1,238 | 2,306 | 3,124 | 4,611 | 6,248 | 8,613 | 11,671 | 16,704 | 22,634 |
| 6,000 | 414 | 945 | 1,280 | 2,385 | 3,232 | 4,770 | 6,463 | 8,910 | 12,073 | 17,280 | 23,415 |
| 6,200 | 427 | 977 | 1,323 | 2,465 | 3,339 | 4,929 | 6,679 | 9,207 | 12,476 | 17,856 | 24,195 |
| 6,400 | 441 | 1,008 | 1,366 | 2,544 | 3,447 | 5,088 | 6,894 | 9,504 | 12,878 | 18,432 | 24,976 |
| 6,600 | 455 | 1,040 | 1,409 | 2,624 | 3,555 | 5,247 | 7,110 | 9,801 | 13,280 | 19,008 | 25,756 |
| 6,800 | 469 | 1,071 | 1,451 | 2,703 | 3,663 | 5,406 | 7,325 | 10,098 | 13,683 | 19,584 | 26,537 |
| 7,000 | 483 | 1,103 | 1,494 | 2,783 | 3,770 | 5,565 | 7,541 | 10,395 | 14,085 | 20,160 | 27,317 |
| 7,200 | 496 | 1,134 | 1,537 | 2,862 | 3,878 | 5,724 | 7,756 | 10,692 | 14,488 | 20,736 | 28,098 |
| 7,400 | 510 | 1,166 | 1,579 | 2,942 | 3,986 | 5,883 | 7,972 | 10,989 | 14,890 | 21,312 | 28,878 |
| 7,600 | 524 | 1,197 | 1,622 | 3,021 | 4,093 | 6,042 | 8,187 | 11,286 | 15,293 | 21,888 | 29,659 |
| 7,800 | 538 | 1,229 | 1,665 | 3,101 | 4,201 | 6,201 | 8,402 | 11,583 | 15,695 | 22,464 | 30,439 |
| 8,000 | 552 | 1,260 | 1,707 | 3,180 | 4,309 | 6,360 | 8,618 | 11,880 | 16,098 | 23,040 | 31,220 |
| 8,200 | 565 | 1,292 | 1,750 | 3,260 | 4,417 | 6,519 | 8,833 | 12,177 | 16,500 | 23,616 | 32,000 |
| 8,400 | 579 | 1,323 | 1,793 | 3,339 | 4,524 | 6,678 | 9,049 | 12,474 | 16,902 | 24,192 | 32,780 |
| 8,600 | 593 | 1,355 | 1,835 | 3,419 | 4,632 | 6,837 | 9,264 | 12,771 | 17,305 | 24,768 | 33,561 |
| 8,800 | 607 | 1,386 | 1,878 | 3,498 | 4,740 | 6,996 | 9,480 | 13,068 | 17,707 | 25,344 | 34,341 |
| 9,000 | 621 | 1,418 | 1,921 | 3,578 | 4,848 | 7,155 | 9,695 | 13,365 | 18,110 | 25,920 | 35,122 |
| 9,200 | 634 | 1,449 | 1,963 | 3,657 | 4,955 | 7,314 | 9,911 | 13,662 | 18,512 | 26,496 | 35,902 |
| 9,400 | 648 | 1,481 | 2,006 | 3,737 | 5,063 | 7,473 | 10,126 | 13,959 | 18,915 | 27,072 | 36,683 |
| 9,600 | 662 | 1,512 | 2,049 | 3,816 | 5,171 | 7,632 | 10,341 | 14,256 | 19,317 | 27,648 | 37,463 |
| 9,800 | 676 | 1,544 | 2,091 | 3,896 | 5,278 | 7,791 | 10,557 | 14,553 | 19,720 | 28,224 | 38,244 |
| 10,000 | 689 | 1,575 | 2,134 | 3,975 | 5,386 | 7,950 | 10,772 | 14,850 | 20,122 | 28,800 | 39,024 |
| 10,153 | 700 | 1,599 | 2,167 | 4,036 | 5,468 | 8,071 | 10,936 | 15,077 | 20,429 | 29,240 | 39,620 |

MEASUREMENTS / SPECIFICATIONS

Conversion Formulas

TWHC High Cycle Hydraulic Torque Wrench Pressure - Torque Conversion Chart

| Pump Pressure | | Torque Output | | | | | | | |
|---------------|-----|---------------|-------|-------|-------|-------|-------|--------|--------|
| | | TWHC1 | | TWHC3 | | TWHC6 | | TWHC50 | |
| PSI | BAR | lb-ft | Nm | lb-ft | Nm | lb-ft | Nm | lb-ft | Nm |
| 1,200 | 83 | 170 | 230 | 376 | 510 | 726 | 984 | 6,360 | 8,618 |
| 1,400 | 97 | 198 | 268 | 439 | 595 | 847 | 1,148 | 7,420 | 10,054 |
| 1,600 | 110 | 226 | 306 | 502 | 680 | 968 | 1,312 | 8,480 | 11,491 |
| 1,800 | 124 | 254 | 345 | 564 | 765 | 1,089 | 1,476 | 9,540 | 12,927 |
| 2,000 | 138 | 283 | 383 | 627 | 850 | 1,210 | 1,640 | 10,600 | 14,363 |
| 2,200 | 152 | 311 | 421 | 690 | 935 | 1,331 | 1,804 | 11,660 | 15,799 |
| 2,400 | 165 | 339 | 460 | 753 | 1,020 | 1,452 | 1,967 | 12,720 | 17,236 |
| 2,600 | 179 | 367 | 498 | 815 | 1,105 | 1,573 | 2,131 | 13,780 | 18,672 |
| 2,800 | 193 | 396 | 536 | 878 | 1,190 | 1,694 | 2,295 | 14,840 | 20,108 |
| 3,000 | 207 | 424 | 574 | 941 | 1,275 | 1,815 | 2,459 | 15,900 | 21,545 |
| 3,200 | 221 | 452 | 613 | 1,004 | 1,360 | 1,936 | 2,623 | 16,960 | 22,981 |
| 3,400 | 234 | 480 | 651 | 1,066 | 1,445 | 2,057 | 2,787 | 18,020 | 24,417 |
| 3,600 | 248 | 509 | 689 | 1,129 | 1,530 | 2,178 | 2,951 | 19,080 | 25,854 |
| 3,800 | 262 | 537 | 728 | 1,192 | 1,615 | 2,299 | 3,115 | 20,140 | 27,290 |
| 4,000 | 276 | 565 | 766 | 1,254 | 1,700 | 2,420 | 3,279 | 21,200 | 28,726 |
| 4,200 | 290 | 593 | 804 | 1,317 | 1,785 | 2,541 | 3,443 | 22,260 | 30,163 |
| 4,400 | 303 | 622 | 842 | 1,380 | 1,870 | 2,662 | 3,607 | 23,320 | 31,599 |
| 4,600 | 317 | 650 | 881 | 1,443 | 1,955 | 2,783 | 3,771 | 24,380 | 33,035 |
| 4,800 | 331 | 678 | 919 | 1,505 | 2,040 | 2,904 | 3,935 | 25,440 | 34,472 |
| 5,000 | 345 | 707 | 957 | 1,568 | 2,125 | 3,025 | 4,099 | 26,500 | 35,908 |
| 5,200 | 359 | 735 | 996 | 1,631 | 2,210 | 3,146 | 4,263 | 27,560 | 37,344 |
| 5,400 | 372 | 763 | 1,034 | 1,693 | 2,295 | 3,267 | 4,427 | 28,620 | 38,780 |
| 5,600 | 386 | 791 | 1,072 | 1,756 | 2,380 | 3,388 | 4,591 | 29,680 | 40,217 |
| 5,800 | 400 | 820 | 1,110 | 1,819 | 2,465 | 3,509 | 4,755 | 30,740 | 41,653 |
| 6,000 | 414 | 848 | 1,149 | 1,882 | 2,550 | 3,630 | 4,919 | 31,800 | 43,089 |
| 6,200 | 427 | 876 | 1,187 | 1,944 | 2,635 | 3,751 | 5,083 | 32,860 | 44,526 |
| 6,400 | 441 | 904 | 1,225 | 2,007 | 2,720 | 3,872 | 5,247 | 33,920 | 45,962 |
| 6,600 | 455 | 933 | 1,264 | 2,070 | 2,805 | 3,993 | 5,411 | 34,980 | 47,398 |
| 6,800 | 469 | 961 | 1,302 | 2,132 | 2,890 | 4,114 | 5,575 | 36,040 | 48,835 |
| 7,000 | 483 | 989 | 1,340 | 2,195 | 2,975 | 4,235 | 5,738 | 37,100 | 50,271 |
| 7,200 | 496 | 1,017 | 1,379 | 2,258 | 3,060 | 4,356 | 5,902 | 38,160 | 51,707 |
| 7,400 | 510 | 1,046 | 1,417 | 2,321 | 3,144 | 4,477 | 6,066 | 39,220 | 53,144 |
| 7,600 | 524 | 1,074 | 1,455 | 2,383 | 3,229 | 4,598 | 6,230 | 40,280 | 54,580 |
| 7,800 | 538 | 1,102 | 1,493 | 2,446 | 3,314 | 4,719 | 6,394 | 41,340 | 56,016 |
| 8,000 | 552 | 1,130 | 1,532 | 2,509 | 3,399 | 4,840 | 6,558 | 42,400 | 57,453 |
| 8,200 | 565 | 1,159 | 1,570 | 2,572 | 3,484 | 4,961 | 6,722 | 43,460 | 58,889 |
| 8,400 | 579 | 1,187 | 1,608 | 2,634 | 3,569 | 5,082 | 6,886 | 44,520 | 60,325 |
| 8,600 | 593 | 1,215 | 1,647 | 2,697 | 3,654 | 5,203 | 7,050 | 45,580 | 61,762 |
| 8,800 | 607 | 1,243 | 1,685 | 2,760 | 3,739 | 5,324 | 7,214 | 46,640 | 63,198 |
| 9,000 | 621 | 1,272 | 1,723 | 2,822 | 3,824 | 5,445 | 7,378 | 47,700 | 64,634 |
| 9,200 | 634 | 1,300 | 1,761 | 2,885 | 3,909 | 5,566 | 7,542 | 48,760 | 66,070 |
| 9,400 | 648 | 1,328 | 1,800 | 2,948 | 3,994 | 5,687 | 7,706 | 49,820 | 67,507 |
| 9,600 | 662 | 1,356 | 1,838 | 3,011 | 4,079 | 5,808 | 7,870 | 50,880 | 68,943 |
| 9,800 | 676 | 1,385 | 1,876 | 3,073 | 4,164 | 5,929 | 8,034 | 51,940 | 70,379 |
| 10,000 | 689 | 1,413 | 1,915 | 3,136 | 4,249 | 6,050 | 8,198 | 53,000 | 71,816 |
| 10,153 | 700 | 1,435 | 1,944 | 3,184 | 4,314 | 6,142 | 8,323 | 53,809 | 72,912 |

Recommended Bolt Stresses for ANSI B16.5, BS1560 and MSS SP44 Flanges

| Nom Bore | Flange Class | | | | | |
|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | 150 lb (PN20) | 300 lb (PN50) | 600 lb (PN100) | 900 lb (PN150) | 1,500 lb (PN250) | 2,500 lb (PN420) |
| 1/2" (15) | 4 x 1/2" (M14) | 4 x 1/2" (M14) | 4 x 1/2" (M14) | 4 x 3/4" (M20) | 4 x 3/4" (M20) | 4 x 3/4" (M20) |
| 3/4" (20) | 4 x 1/2" (M14) | 4 x 5/8" (M16) | 4 x 5/8" (M16) | 4 x 3/4" (M20) | 4 x 3/4" (M20) | 4 x 3/4" (M20) |
| 1" (25) | 4 x 1/2" (M14) | 4 x 5/8" (M16) | 4 x 5/8" (M16) | 4 x 7/8" (M24) | 4 x 7/8" (M24) | 4 x 7/8" (M24) |
| 1-1/4" (32) | 4 x 1/2" (M14) | 4 x 5/8" (M16) | 4 x 5/8" (M16) | 4 x 7/8" (M24) | 4 x 7/8" (M24) | 4 x 1" (M27) |
| 1-1/2" (40) | 4 x 1/2" (M14) | 4 x 3/4" (M20) | 4 x 3/4" (M20) | 4 x 1" (M27) | 4 x 1" (M27) | 4 x 1-1/8" (M30) |
| 2" (50) | 4 x 5/8" (M16) | 8 x 5/8" (M16) | 8 x 5/8" (M16) | 8 x 7/8" (M24) | 8 x 7/8" (M24) | 8 x 1" (M27) |
| 2-1/2" (65) | 4 x 5/8" (M16) | 8 x 3/4" (M20) | 8 x 3/4" (M20) | 8 x 1" (M27) | 8 x 1" (M27) | 8 x 1-1/8" (M30) |
| 3" (80) | 4 x 5/8" (M16) | 8 x 3/4" (M20) | 8 x 3/4" (M20) | 8 x 7/8" (M24) | 8 x 1-1/8" (M30) | 8 x 1-1/4" (M33) |
| 4" (100) | 8 x 5/8" (M16) | 8 x 3/4" (M20) | 8 x 3/4" (M24) | 8 x 7/8" (M30) | 8 x 1-1/4" (M33) | 8 x 1-1/2" (M39) |
| 5" (125) | 8 x 3/4" (M20) | 8 x 3/4" (M20) | 8 x 1" (M27) | 8 x 1-1/4" (M33) | 8 x 1-1/2" (M39) | 8 x 1-3/4" (M45) |
| 6" (150) | 8 x 3/4" (M20) | 12 x 3/4" (M20) | 12 x 1" (M27) | 12 x 1-1/8" (M30) | 12 x 1-3/8" (M36) | 8 x 2" (M52) |
| 8" (200) | 8 x 3/4" (M20) | 12 x 7/8" (M24) | 12 x 1-1/8" (M30) | 12 x 1-3/8" (M36) | 12 x 1-5/8" (M42) | 12 x 2" (M52) |
| 10" (250) | 12 x 7/8" (M24) | 16 x 1" (M27) | 16 x 1-1/4" (M33) | 16 x 1-3/8" (M36) | 12 x 1-7/8" (M48) | 12 x 2-1/2" (M70) |
| 12" (300) | 12 x 7/8" (M24) | 16 x 1-1/8" (M30) | 20 x 1-1/4" (M33) | 20 x 1-3/8" (M36) | 16 x 2" (M52) | 12 x 2-3/4" (M70) |
| 14" (350) | 12 x 1" (M27) | 20 x 1-1/8" (M30) | 20 x 1-3/8" (M36) | 20 x 1-1/2" (M39) | 16 x 2-1/4" (M56) | |
| 16" (400) | 16 x 1" (M27) | 20 x 1-1/4" (M33) | 20 x 1-1/2" (M39) | 20 x 1-5/8" (M42) | 16 x 2-1/2" (M64) | |
| 18" (450) | 16 x 1-1/8" (M30) | 24 x 1-1/4" (M33) | 20 x 1-5/8" (M42) | 20 x 1-7/8" (M48) | 16 x 2-3/4" (M70) | |
| 20" (500) | 20 x 1-1/8" (M30) | 24 x 1-1/4" (M33) | 24 x 1-5/8" (M42) | 20 x 2" (M52) | 16 x 3" (M76) | |
| 24" (600) | 20 x 1-1/4" (M33) | 24 x 1-1/2" (M39) | 24 x 1-7/8" (M48) | 20 x 2-1/2" (M64) | 16 x 3-1/2" (M90) | |
| 26" (650) | 24 x 1-1/4" (M33) | 28 x 1-5/8" (M42) | 24 x 1-7/8" (M48) | 20 x 2-3/4" (M70) | | |
| 28" (700) | 28 x 1-1/4" (M33) | 28 x 1-5/8" (M42) | 28 x 2" (M52) | 20 x 3" (M76) | | |
| 30" (750) | 28 x 1-1/4" (M33) | 28 x 1-3/4" (M45) | 28 x 2" (M52) | 20 x 3" (M76) | | |
| 32" (800) | 28 x 1-1/2" (M39) | 28 x 1-7/8" (M48) | 28 x 2-1/4" (M56) | 20 x 3-1/4" (M85) | | |
| 34" (850) | 32 x 1-1/2" (M39) | 28 x 1-7/8" (M48) | 28 x 2-1/4" (M56) | 20 x 3-1/2" (M90) | | |
| 36" (90) | 32 x 1-1/2" (M39) | 32 x 2" (M52) | 28 x 2-1/2" (M64) | 20 x 3-1/2" (M90) | | |

Recommended Bolt Stress

40,000 lbf/in² 45,000 lbf/in² 50,000 lbf/in²

The above stress levels are suitable for flanges with a minimum material yield stress of 30,000 lb/in² and bolt material grades ASTM A193 B7, B16, B7M and ASTM A320 L7, L43, L7M.

Information is used at the owner's discretion. All data is given in good faith and without acceptance of responsibility on the part of SPX FLOW.

MEASUREMENTS / SPECIFICATIONS

Reference Tables

Typical Co-Efficient Values For Bolt Lubricants

| Manufacturer | Product | Coefficient of Friction |
|--------------------------|------------------------------|-------------------------|
| Acheson Colloids | Anti seize | 0.09 |
| | DAG580 (Dry Lubricant) | 0.16 |
| Belzona Molecular Ltd | HP anti seize | 0.15 |
| | Copperslip | 0.09 |
| Bostik Ltd | Never seez Std grade (NS160) | 0.18 |
| | Never seez Spl grade (NS165) | 0.18 |
| Castrol | Castrol Nucleol S202 | 0.08 |
| | Spherol Castrol | 0.13 |
| Comma Oil & Chemicals | Copper Ease | 0.14 |
| Chemodex | Coppergrease | 0.15 |
| Chesterton International | Anti Seize (paste) | 0.14 |
| Dow Corning | Molykote Cu-7439 | 0.15 |
| | Molykote 1000 | 0.11 |
| | Molykote G-Rapid | 0.08 |
| | Molykote G-Rapid Plus | 0.09 |
| Fordec | Fordec Copper Anti seize | 0.15 |
| Ilex Lubricants | Coppercrest | 0.14 |
| Molyslip | Molyslip AS60 | 0.07 |
| National Chemical Co | Thread Eze | 0.18 |
| | Copaslip | 0.12 |
| OKS | OKS 240 | 0.12 |
| | OKS 250 | 0.08 |
| K.S. Paul | Easyrun 100 | 0.08 |
| | PBC | 0.13 |
| | PBC/D Lead Free | 0.12 |
| Rocol | 516 | 0.18 |
| | Rocol ASP | 0.10 |
| | Rocol J166 | 0.15 |
| Silkolene | Rocol 797 | 0.16 |
| | Silkease Copper | 0.14 |
| Sovereign Lubricants | Omega 99 | 0.13 |
| | Omega 99N | 0.09 |
| | Omega 95 | 0.12 |
| Swan Chemicals | Swanlube | 0.12 |
| James Walker | Walkers Anti seize No 203 | 0.15 |
| Wessex Chemical Factors | WCF Anti Seize | 0.15 |

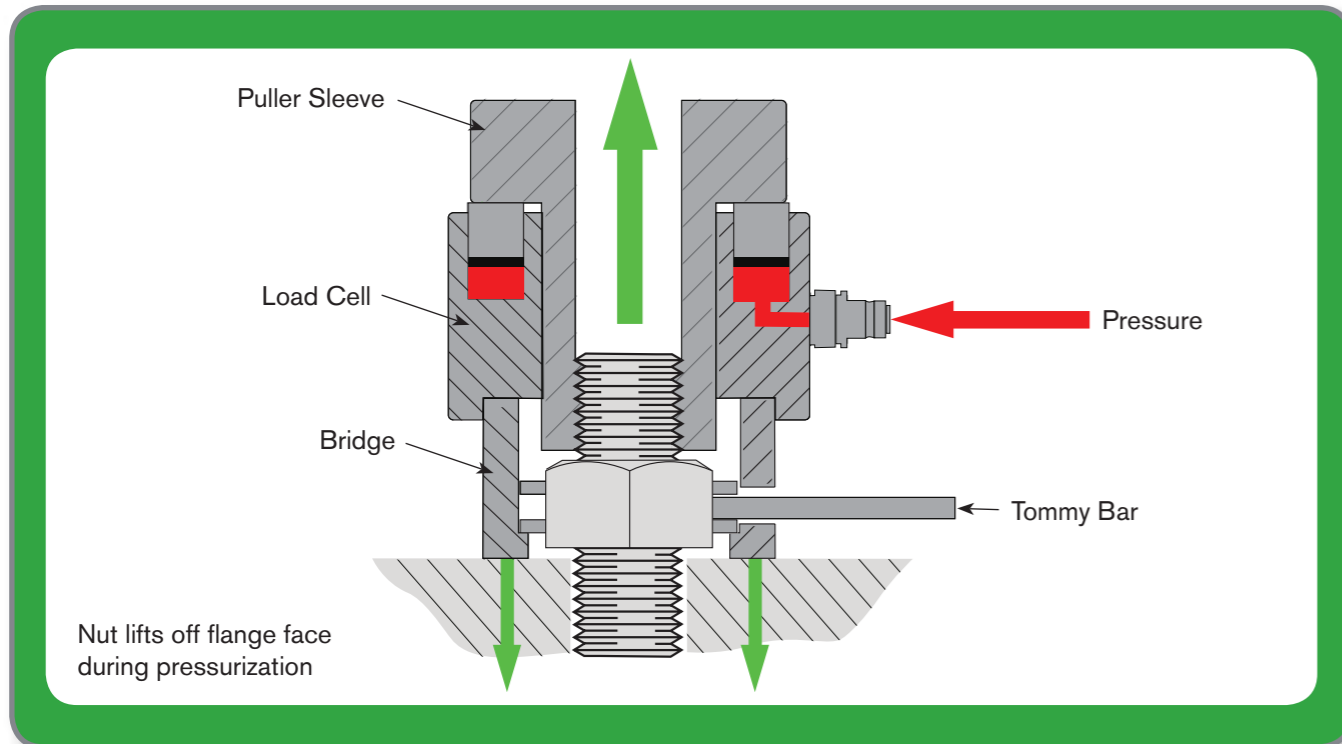
MEASUREMENTS / SPECIFICATIONS

Torque Requirements for Imperial Bolts

IMPERIAL TORQUE (Values = lb-ft)

| Bolt Diameter Nut A/F | 1/2" | | 3/4" | | 1" | | 1-1/8" | | 1-1/4" | | 1-3/8" | | 1-1/2" | | 1-5/8" | | 1-3/4" | | 1-7/8" | | 2" | | 2-1/4" | | 2-1/2" | | 2-3/4" | | 3" | | 3-1/4" | | 3-1/2" | | 3-3/4" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|----------|----|------|----|-----|-----|--------|-----|--------|-----|--------|-----|--------|-------|--------|-------|--------|-------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------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| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Torque figures in this section will induce Residual Bolt Loads equivalent to the white/grey section in the Imperial Torque table on the next page. These values are typical for clamp connectors | μ = 0.08 | 17 | 33 | 58 | 138 | 200 | 278 | 375 | 491 | 629 | 790 | 978 | 1,192 | 1,708 | 2,294 | 3,171 | 4,255 | 5,544 | 7,082 | 8,883 | 10,956 | 14,104 | 18,414 | 23,914 | 30,614 | 38,514 | 47,614 | 57,914 | 69,414 | 82,114 | 96,114 | 111,414 | 128,014 | 145,814 | 164,814 | 185,014 | 206,414 | 229,014 | 252,814 | 277,814 | 304,014 | 331,414 | 359,814 | 389,214 | 419,614 | 450,814 | 482,814 | 515,414 | 548,614 | 582,414 | 616,814 | 651,814 | 687,414 | 723,614 | 760,414 | 797,814 | 835,814 | 874,414 | 913,614 | 953,414 | 993,814 | 1034,814 | 1076,414 | 1118,614 | 1161,414 | 1204,814 | 1248,814 | 1293,414 | 1338,614 | 1384,414 | 1430,814 | 1477,814 | 1525,414 | 1573,614 | 1622,414 | 1671,814 | 1721,414 | 1771,214 | 1821,414 | 1872,014 | 1923,214 | 1974,014 | 2025,414 | 2077,414 | 2129,814 | 2182,414 | 2235,214 | 2288,214 | 2341,614 | 2395,414 | 2449,614 | 2504,214 | 2559,214 | 2614,614 | 2670,414 | 2726,614 | 2783,214 | 2840,214 | 2897,614 | 2955,414 | 3013,614 | 3072,214 | 3131,214 | 3190,614 | 3250,414 | 3310,614 | 3371,214 | 3432,414 | 3494,014 | 3556,014 | 3618,414 | 3681,214 | 3744,414 | 3808,014 | 3872,014 | 3936,414 | 4001,214 | 4066,414 | 4132,014 | 4198,014 | 4264,414 | 4331,414 | 4398,814 | 4466,614 | 4534,814 | 4603,414 | 4672,414 | 4741,814 | 4811,614 | 4881,814 | 4952,414 | 5023,414 | 5094,814 | 5166,014 | 5237,814 | 5309,814 | 5382,014 | 5454,414 | 5527,014 | 5600,014 | 5673,214 | 5746,614 | 5820,214 | 5894,014 | 5968,014 | 6042,214 | 6116,614 | 6191,214 | 6266,014 | 6341,214 | 6416,614 | 6492,214 | 6568,014 | 6644,014 | 6720,214 | 6796,614 | 6873,214 | 6950,014 | 7027,014 | 7104,214 | 7181,614 | 7259,214 | 7337,014 | 7415,014 | 7493,214 | 7571,614 | 7650,214 | 7729,014 | 7808,014 | 7887,214 | 7966,614 | 8046,214 | 8126,014 | 8206,014 | 8286,214 | 8366,614 | 8447,214 | 8528,014 | 8609,014 | 8690,214 | 8771,614 | 8853,214 | 8935,014 | 9017,014 | 9099,214 | 9181,614 | 9264,214 | 9347,014 | 9430,014 | 9513,214 | 9596,614 | 9680,214 | 9764,014 | 9848,014 | 9932,214 | 10016,814 | 10101,614 | 10186,414 | 10271,414 | 10356,614 | 10442,014 | 10527,614 | 10613,414 | 10699,414 | 10785,614 | 10872,014 | 10958,614 | 11045,414 | 11132,414 | 11219,614 | 11307,014 | 11394,614 | 11482,414 | 11570,414 | 11658,614 | 11747,014 | 11835,614 | 11924,414 | 12013,414 | 12102,614 | 12192,014 | 12281,614 | 12371,414 | 12461,414 | 12551,614 | 12642,014 | 12732,614 | 12823,414 | 12914,414 | 13005,614 | 13097,014 | 13188,614 | 13280,414 | 13372,414 | 13464,614 | 13557,014 | 13650,014 | 13743,414 | 13837,014 | 13930,614 | 14024,414 | 14118,414 | 14212,614 | 14307,014 | 14401,614 | 14496,414 | 14591,414 | 14686,414 | 14781,614 | 14877,014 | 14972,614 | 15068,414 | 15164,414 | 15260,614 | 15357,014 | 15453,614 | 15550,414 | 15647,414 | 15744,614 | 15842,014 | 15939,614 | 16037,414 | 16135,414 | 16233,614 | 16332,014 | 16430,614 | 16529,414 | 16628,414 | 16727,614 | 16827,014 | 16926,614 | 17026,414 | 17126,414 | 17226,614 | 17326,814 | 17427,214 | 17527,814 | 17628,414 | 17729,214 | 17829,814 | 17930,614 | 18031,414 | 18132,414 | 18233,614 | 18334,814 | 18436,214 | 18537,814 | 18639,614 | 18741,614 | 18843,814 | 18946,214 | 19048,814 | 19151,614 | 19254,614 | 19357,814 | 19461,214 | 19564,814 | 19668,614 | 19772,614 | 19876,814 | 19981,214 | 20085,814 | 20190,614 | 20295,414 | 20400,414 | 20505,614 | 20611,014 | 20716,614 | 20822,414 | 20928,414 | 21034,614 | 21141,014 | 21247,614 | 21354,414 | 21461,414 | 21568,614 | 21676,014 | 21783,614 | 21891,414 | 21999,414 | 22107,614 | 22216,014 | 22324,614 | 22433,414 | 22542,414 | 22651,614 | 22761,014 | 22870,614 | 22980,414 | 23090,414 | 23200,614 | 23310,814 | 23421,414 | 23532,214 | 23643,214 | 23754,414 | 23865,814 | 23977,414 | 24089,014 | 24200,814 | 24312,814 | 24425,014 | 24537,414 | 24650,014 | 24762,814 | 24875,814 | 24989,014 | 25102,414 | 25216,014 | 25329,614 | 25443,414 | 25557,414 | 25671,614 | 25786,014 | 25900,614 | 26015,214 | 26130,014 | 26245,014 | 26360,214 | 26475,614 | 26591,214 | 26706,814 | 26822,614 | 26938,414 | 27054,414 | 27170,614 | 27287,014 | 27403,614 | 27520,414 | 27637,414 | 27754,614 | 27872,014 | 27989,614 | 28107,414 | 28225,414 | 28343,614 | 28462,014 | 28580,614 | 28699,414 | 28818,414 | 28937,614 | 29057,014 | 29176,614 | 29296,414 | 29416,414 | 29536,614 | 29657,014 | 29777,614 | 29898,414 | 30019,414 | 30140,614 | 30262,014 | 30383,614 | 30505,414 | 30627,414 | 30749,614 | 30872,014 | 30994,614 | 31117,414 | 31240,414 | 31363,614 | 31487,014 | 31610,614 | 31734,414 | 31858,414 | 31982,614 | 32107,014 | 32231,614 | 32356,414 | 32481,414 | 32606,414 | 32731,614 | 32857,014 | 32982,614 | 33108,414 | 33234,414 | 33360,614 | 33487,014 | 33613,614 | 33740,414 | 33867,414 | 33994,614 | 34122,014 | 34249,614 | 34377,414 | 34505,414 | 34633,614 | 34762,014 | 34890,614 | 35019,414 | 35148,414 | 35277,614 | 35407,014 | 35536,614 | 35666,414 | 35796,414 | 35926,614 | 36057,014 | 36187,614 | 36318,414 | 36449,414 | 36580,614 | 36711,814 | 36843,414 | 36975,014 | 37106,614 | 37238,414 | 37370,414 | 37502,614 | 37635,014 | 37767,614 | 37900,414 | 38033,414 | 38166,614 | 38300,014 | 38433,614 | 38567,414 | 38701,414 | 38835,414 | 38969,614 | 39104,014 | 39238,614 | 39373,214 | 39508,014 | 39642,814 | 39777,814 | 39912,814 | 40048,014 | 40183,214 | 40318,614 | 40454,214 | 40589,814 | 40725,614 | 40861,614 | 40997,814 | 41134,214 | 41270,814 | 41407,614 | 41544,614 | 41681,814 | 41819,414 | 41957,214 | 42095,214 | 42233,414 | 42371,814 | 42510,414 | 42649,214 | 42788,214 | 42927,414 | 43066,814 | 43206,414 | 43346,214 | 43486,214 | 43626,414 | 43766,814 | 43907,414 | 44048,214 | 44189,214 | 44330,414 | 44471,814 | 44613,414 | 44755,214 | 44897,214 | 45039,414 | 45181,814 | 45324,414 | 45467,214 | 45610,214 | 45753,414 | 45896,814 | 46040,414 | 46184,214 | 46328,214 | 46472,414 | 46616,814 | 46761,414 | 46906,014 | 47050,814 | 47195,814 | 47340,814 | 47486,014 | 47631,414 | 47777,014 | 47922,814 | 48068,814 | 48214,814 | 48361,014 | 48507,414 | 48654,014 | 48800,814 | 48947,814 | 49095,014 | 49242,414 | 49389,814 | 49537,414 | 49685,214 | 49833,214 | 49981,414 | 50129,814 | 50278,414 | 50427,214 | 50576,214 | 50725,414 | 50874,814 | 51024,414 | 51174,014 | 51323,814 | 51473,814 | 51623,814 | 51774,014 | 51924,214 | 52074,614 | 52225,214 | 52375,814 | 52526,614 | 52677,414 | 52828,414 | 52979,614 | 53130,814 | 53282,214 | 53433,814 | 53585,414 | 53737,214 | 53889,214 | 54041,414 | 54193,814 | 54346,414 | 54499,214 | 54652,014 | 54805,014 | 54958,214 | 55111,614 | 55265,214 | 55418,814 | 55572,614 | 55726,414 | 55880,414 | 56034,614 | 56189,014 | 56343,614 | 56498,214 | 56653,014 | 56807,814 | 56962,814 | 57117,814 | 57273,014 | 57428,214 | 57583,614 | 57739,214 | 57894,814 | 58050,614 | 58206,414 | 58362,414 | 58518,614 | 58675,014 | 58831,614 | 58988,414 | 59145,214 | 59302,214 | 59459,414 | 59616,814 | 59774,414 | 59932,014 | 60090,014 | 60248,214 | 60406,614 | 60565,214 | 60724,014 | 60883,014 | 61042,214 | 61201,614 | 61361,214 | 61520,814 | 61680,614 | 61840,614 | 62000,814 | 62161,214 | 62321,814 | 62482,614 | 62643,614 | 62804,814 | 62966,214 | 63127,814 | 63289,614 | 63451,614 | 63613,814 | 63776,214 | 63938,814 | 64101,614 | 64264,614 | 64427,814 | 64591,414 | 64755,214 | 64919,214 | 65083,414 | 65247,814 | 65412,414 | 65577,014 | 65741,814 | 65906,814 | 66072,014 | 66237,414 | 66403,014 | 66568,814 | 66734,814 | 66901,014 | 67067,414 | 67234,014 | 67400,814 | 67567,814 | 67735,014 | 67902,414 | 68070,014 | 68237,814 | 68405,814 | 68574,014 | 68742,414 | 68911,014 | 69079,814 | 69248,814 | 69418,014 | 69587,414 | 69757,014 | 69926,814 | 70096,814 | 70267,014 | 70437,414 | 70608,014 | 70778,814 | 70949,814 | 71121,014 | 71292,414 | 71464,014 | 71636,014 | 71808,414 | 71981,014 | 72153,814 | 72326,814 | 72500,014 | 72673,414 | 72847,014 | 73020,814 | 73194,814 | 73369,014 | 73543,614 | 73718,414 | 73893,414 | 74068,614 | 74244,014 | 74419,614 | 74595,414 | 74771,414 | 74947,414 | 75123,614 | 75300,014 | 75476,814 | 75653,814 | 75831,014 | 76008,414 | 76186,014 | 76363,814 | 76541,814 | 76720,014 | 76898,414 | 77077,014 | 77256,014 | 77435,214 | 77614,614 | 77794,214 | 77974,014 | 78154,014 | 78334,214 | 78514,814 | 78695,414 | 78876,014 | 79056,814 | 79237,814 | 79419,014 | 79600,414 | 79782,014 | 79963,814 | 80145,814 | 80328,014 | 80510,414 | 80693,014 | 80875,814 | 81058,814 | 81242,014 | 81425,414 | 81609,014 | 81792,614 | 81976,414 | 82160,414 | 82344,614 | 82529,014 | 82713,614 | 82898,414 | 83083,414 | 83268,614 | 83454,014 | 83639,614 | 83825,414 | 84011,414 | 84197,614 | 84384,014 | 84570,614 | 84757,414 | 84944,414 | 85131,614 | 85319,014 | 85506,614 | 85694,414 | 85882,414 | 86070,614 | 86259,014 | 86447,614 | 86636,414 | 86825,414 | 87014,614 | 87204,014 | 87393,614 | 87583,414 | 87773,414 | 87963,614 | 88154,014 | 88344,614 | 88535,414 | 88726,414 | 88917,614 | 89109,014 | 89300,614 | 89492,414 | 89684,414 | 89876,614 | 90069,014 | 90261,614 | 90454,414 | 90647,414 | 90840,614 | 91034,014 | 91227,814 | 91421,814 | 91616,014 | 91810,614 | 92005,414 | 92200,414 | 92395,614 | 92591,014 | 92786,614 | 92982,414 | 93178,414 | 93374,614 | 93570,814 | 93767,414 | 93964,214 | 94161,414 | 94358,814 | 94556,414 | 94754,214 | 94952,414 | 95150,814 | 95349,414 | 95548,214 | 95747,214 | 95946,414 | 96145,814 | 96345,414 | 96545,014 | 96744,814 | 96944,814 | 97145,014 | 97345,414 | 97546,014 | 97746,814 | 97947,814 | 98149,014 | 98350,414 | 98552,014 | 98753,814 | 98955,814 | 99157,814 | 99359,814 | 99562,014 | 99764,414 | 99967,014 | 100170,014 | 100373,414 | 100577,014 | 100780,814 | 100984,814 | 101189,014 | 101393,414 | 101598,014 | 101802,814 | 102007,814 | 102212,814 | 102418,014 | 102623,414 | 102829,014 | 103034,814 | 103240,814 | 103447,014 | 103653,414 | 103859,814 | 104066,414 | 104273,214 | 104480,214 | 104687,414 | 104894,814 | 105102,414 | 105310,214 | 105518,214 | 10572 |

BOLT TENSIONERS HOW IT WORKS



Hydraulic tensioning is a method of stretching the stud in lieu of turning the nut as with traditional torquing. Each stud has a yield strength, and can be stretched as a form of tightening, eliminating galling and friction, and the need for lubricants.

Hydraulic Bolt Tensioners are used to provide the most accurate residual bolt load and uniform compression on the gasket. The bolt tensioner can be applied to a single bolt or any number of bolts depending upon access and the application. However, to give the most accurate residual load, a bolt tensioner should be placed on, ideally, 50% or 100% of the studs.

(See graphic next page).

The load cell and adapter kit is placed over the top of each stud and nut. The puller is then threaded onto the stud above the nut and sits flush against the hydraulic load cell. Each tool is interconnected with hoses to insure all tools are pressurized simultaneously.

The hydraulic pump unit is activated and as pressure builds throughout the system. The load cell starts to extend and push against the puller, stretching the stud. As this continues, the nut lifts off the flange face. Once the desired pressure is met, the pump valve is closed to

hold the pressure. The socket ring is turned down using a tommy bar so the nut is now back sitting flush on the flange face. Once all the nuts have been turned down, the pump pressure is released and the stud attempts to return to its normal state thus creating a clamping force on the gasket. Since all bolts are tightened at the same time, this provides a uniform load across the joint.

TYPICAL 50% TENSIONER LAYOUT



Assemble tensioners to 50% of the bolts. Apply 'Pressure 1' as indicated on the bolt tensioning data sheet. Tighten down the nuts using a tommy bar.



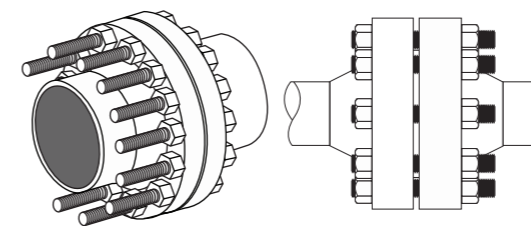
Move the tensioners to the remaining 50% of the bolts and apply 'Pressure 2' as indicated on the bolt tensioning data sheet. Tighten down the nuts using a tommy bar.

Release the system pressure and repeat the reapplication of the pressure and tightening of the nuts a further twice.

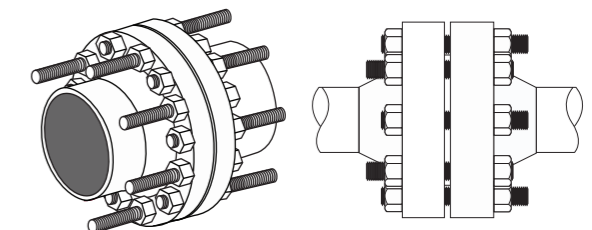
TYPICAL 50% FLANGE SET-UP

For proper tensioner tool fit, there must be ample stud above the nut

50% Bolt Tensioning

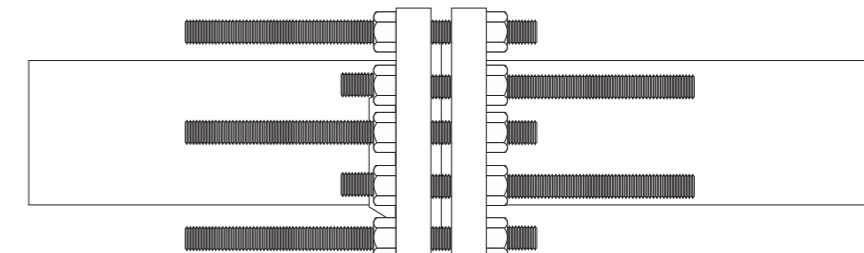


100% Bolt Tensioning

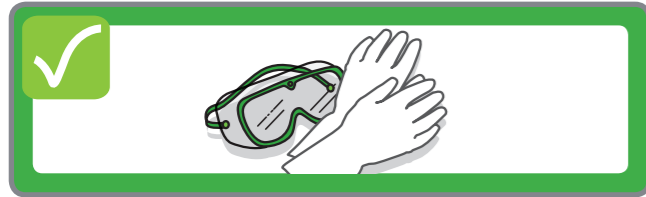


For topside applications, make sure the stud extends a minimum of one bolt diameter above the nut. For subsea applications, refer to the SPX SST tool selection chart for dimension.

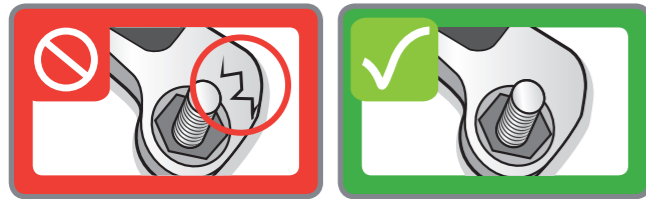
100% Tensioning Set-up for Subsea Tensioning



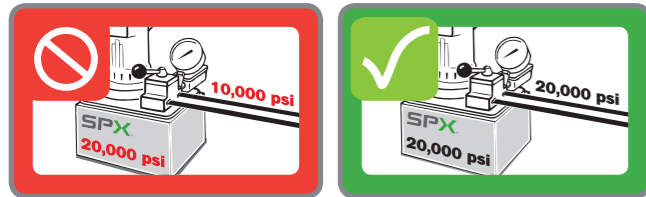
HYDRAULIC BOLTING SAFETY



Wear appropriate Personal Protective Equipment (PPE).



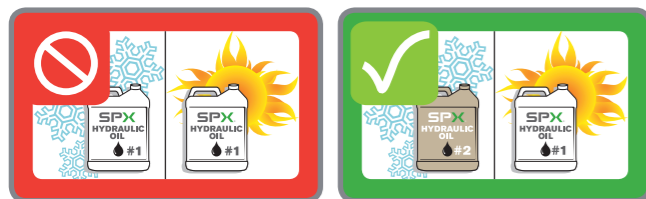
Inspect all components before use. Do not use damaged or worn components. Return to an Authorized Repair Center for repair or replacement.



Recognize system pressures. Do not use a 20,000 PSI pump on a system with 10,000 PSI components (hoses, fittings, valves, tools, etc.).



Do not overfill pump reservoirs.



Do not use the same oil in all equipment and in all environments.



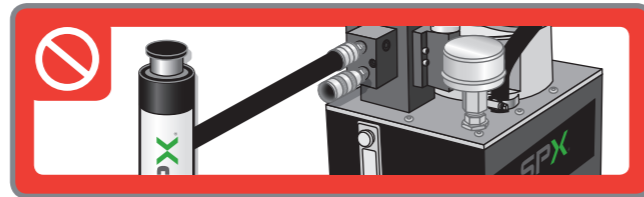
Read all instructions and safety warnings before using the pumps, tools and other equipment.



Do not exceed the rated load of any pump, tool or component.



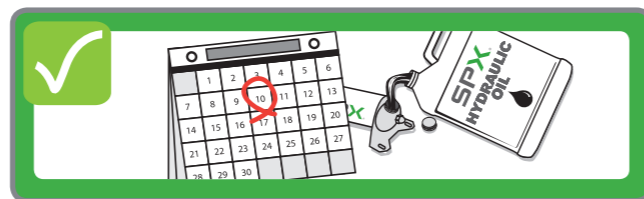
Never alter internal relief valves.



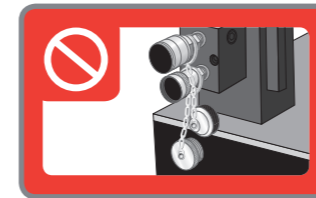
Do not use pumps designed for torque wrenches or tensioners for lifting.



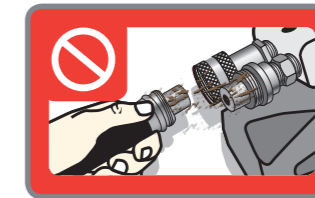
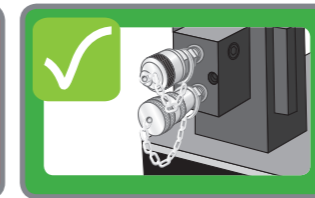
Use only high quality oil, like Power Team hydraulic oil. Using the wrong fluid can lead to equipment damage and premature failure.



Change oil and/or filters at appropriate intervals.



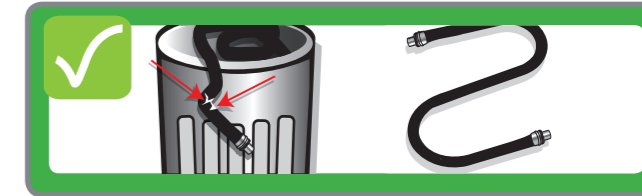
Do not operate a pump with couplers exposed or uncapped.



Clean both ends of the couplers before assembly.



Do not kink hydraulic hoses.



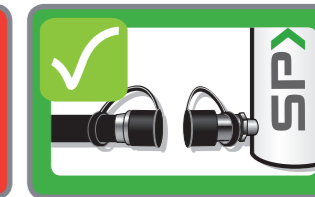
Replace damaged hoses immediately.



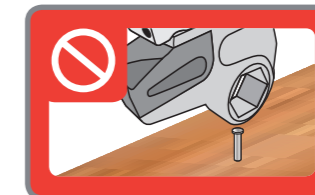
Keep equipment away from excessive temperatures. Do not weld next to unprotected equipment.



Keep couplers capped when not in use.



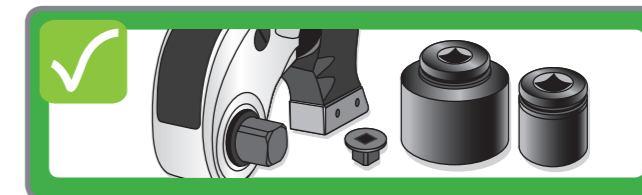
Do not drive over hoses or drop objects onto them.



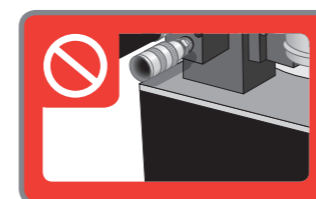
Only use tools for their intended purpose.



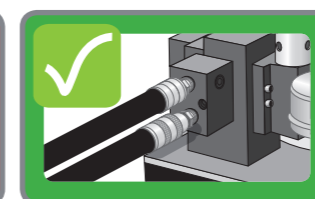
Keep hands clear of pinch points.



Only use high quality impact sockets and reducers with an appropriate load rating and safety factor.



Always connect both torque wrench hoses to the pump. Do not operate with only one hose attached.

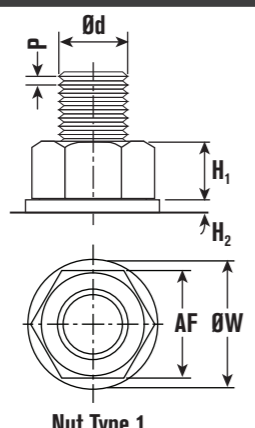


Use only the proper size sockets and links.



APPLICATION DATA SHEET

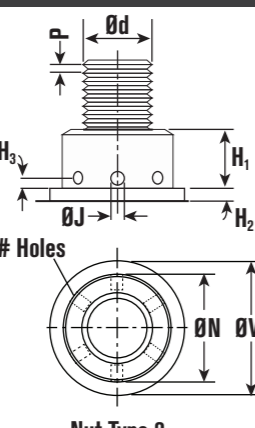
| Nut Type 1 | |
|-----------------|-------|
| $\varnothing d$ | in/mm |
| P (Pitch) | in/mm |
| H1 | in/mm |
| H2 | in/mm |
| AF | in/mm |
| $\varnothing W$ | in/mm |
| | |
| | |
| | |



Nut Type 1

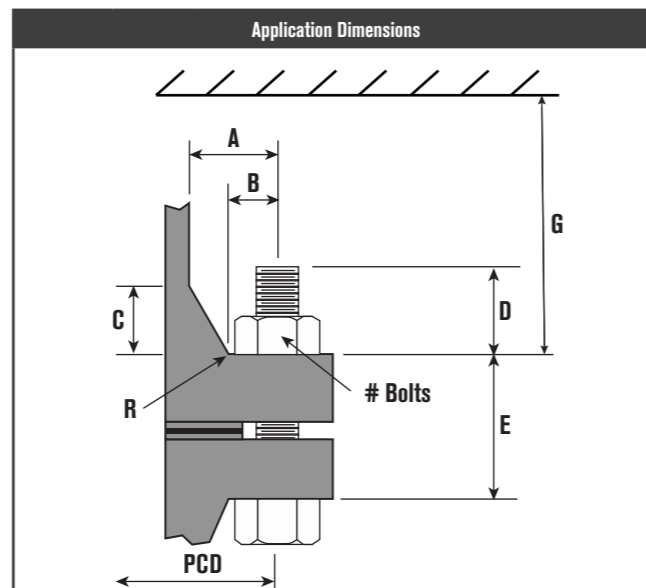
Circle "in" or "mm"

| Nut Type 2 | |
|-----------------|-------|
| $\varnothing d$ | in/mm |
| P (Pitch) | in/mm |
| H1 | in/mm |
| H2 | in/mm |
| $\varnothing N$ | in/mm |
| $\varnothing W$ | in/mm |
| H3 | in/mm |
| $\varnothing J$ | in/mm |
| # of Holes | - |



Nut Type 2

Circle "in" or "mm"



| | | |
|---------|-------|--|
| A | in/mm | |
| B | in/mm | |
| C | in/mm | |
| D | in/mm | |
| E | in/mm | |
| G | in/mm | |
| R | in/mm | |
| # Bolts | - | |
| PCD | in/mm | |

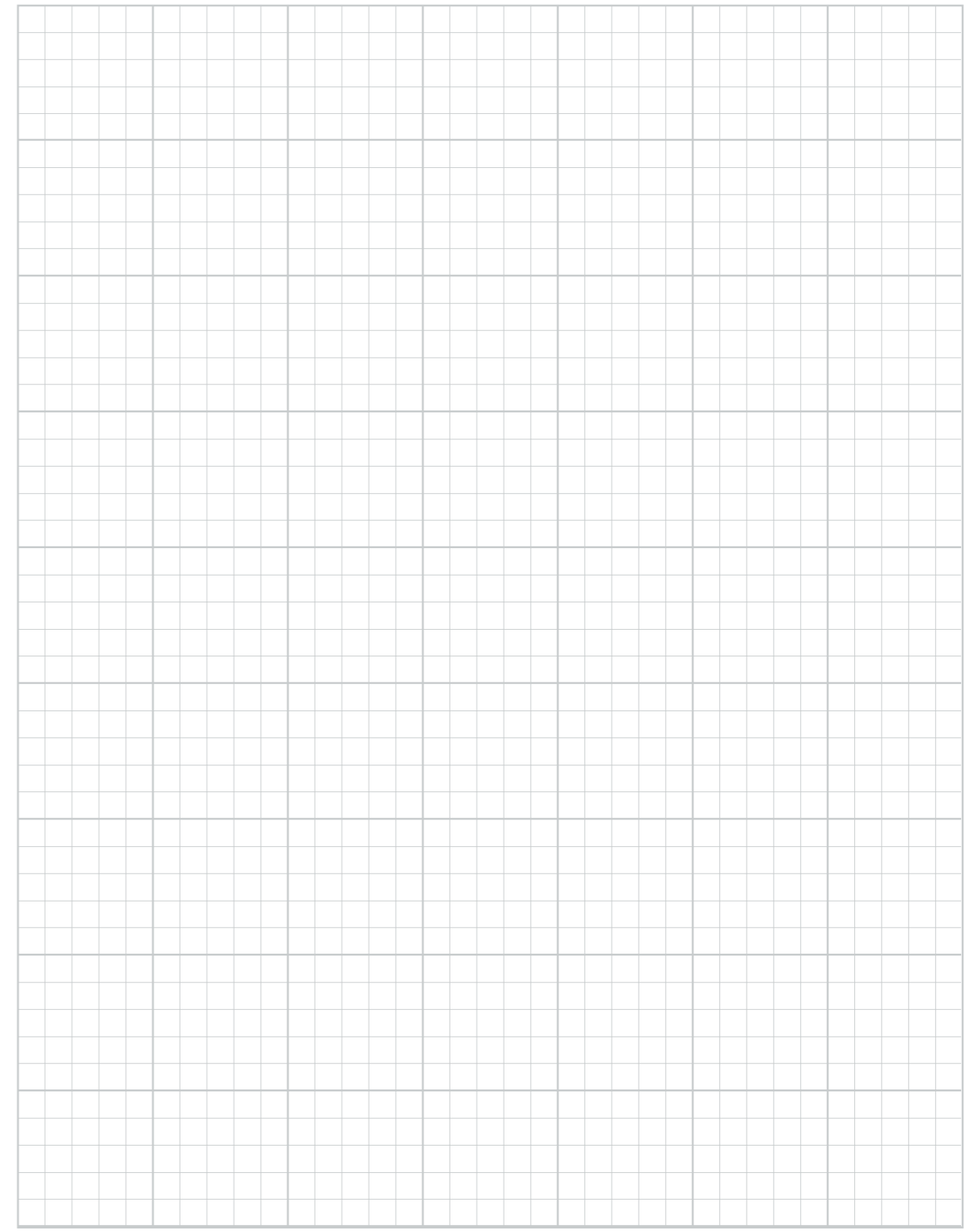
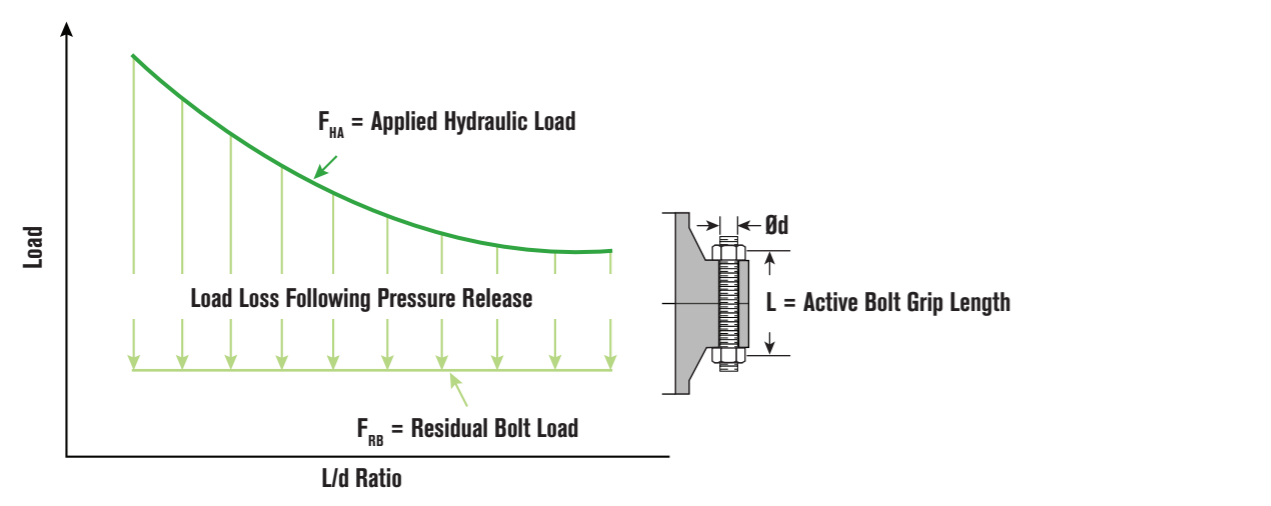
Additional Information

Hot Dip Galvanized Threads : Y/N

Circle "in" or "mm"

Load Requirements

| | | |
|-------------------------------------|---|--|
| APPLIED HYDRAULIC LOAD (F_{HA}) | N | |
| RESIDUAL BOLT LOAD (F_{RB}) | N | |



MEASUREMENTS / SPECIFICATIONS

Manufacturing Standards

Bolting Systems' commitment to quality is evident in everything we do, from raw material receipt to how we support our customers years after they purchase our products. Bolting Systems is registered to ISO 9001:2000 international quality standard. ISO 9001:2000 requires compliance with standards for management, administration, product development, manufacturing and continual improvement. Our Registration verifies that Bolting Systems has adopted and maintains documentation for processes ranging from suppliers to customers, inspection, handling, and training. ISO 9001 also requires periodic internal and external audits to ensure all aspects of work affecting quality control are monitored. This always has been, and will continue to be, our philosophy. That's our guarantee to you.

ASME B30.1

Some Bolting Systems tools are made using Power Team hydraulic cylinders which fully comply with the criteria set forth in the American Society of Mechanical Engineers standard ASME B30.1: Our cylinders are designed to have a minimum of a 2-to-1 safety factor on typical material yield strength; Each cylinder is tested at 125 percent of rated pressure at full travel and is inspected to assure functionality and freedom from leaks.

ASME B40.1

Bolting Systems heavy-duty pressure gauges are designed in accordance with the recommendations set forth in the American Society of Mechanical Engineers standard ASME B40.1, Grade 1A or B.

CE MARK

Bolting Systems is committed to designing, manufacturing, and marketing products that meet or exceed the needs of the customers we serve. Bolting Systems supplies a Declaration of Incorporation or a Declaration of Conformity and CE Marking for products that conform with European Community Directives.

IJ100

Bolting Systems hoses meet the criteria set forth in the Material Handling Institute's specification #IJ100 for hydraulic hose. Under the procedures outlined in this standard, hydraulic hose shall:

1. Have an average minimum life of 30,000 cycles at full rated capacity.

2. Have a minimum burst pressure of at least twice the rated operating pressure.
 - a. CE compliant hoses have a 4:1 burst rate over nominal operating pressure.

CSA

Where specified, Bolting Systems electric power pump assemblies meet the design, assembly, and test requirements of the Canadian Standards Association. Note: If CSA certification is required, it must be requested at the time the pump is ordered.

NEMA

Where specified, Bolting Systems electric power pump assemblies meet the design, assembly, and test requirements of NEMA 12, a National Electrical Manufacturers' Association standard relating to electrical components used to resist moisture and dust.

BOLTING SYSTEMS PRODUCT DESIGN CRITERIA

All Bolting Systems brand hydraulic components are designed and/or tested to be safe for use at maximum operating pressures of 10,000 psi (690 bar) unless otherwise specifically noted.

QUALITY ASSURANCE

All of our products are subjected to quality checks during production. All materials are certified and have traceability to the mill. Before leaving the factory, all pressure containing products are tested to maximum working pressure to ensure on-the-job reliability. We have made every effort to include the latest specifications for our products in this catalog. Please call the Bolting Systems factory for the most current product specifications. The Bolting Systems Lifetime Powerthon™ Warranty is described in more detail on page 133 of this catalog.



> Bolting Systems™

POWERTHON™ LIFETIME WARRANTY

"Bolting Systems" is a registered trademark of the SPX Flow US, LLC. All Bolting Systems products and parts, with the exceptions noted below, are warranted against defects in materials and workmanship for the life of the product or part. (The life of the product or part is defined as that point in time when it no longer safely or properly functions due to normal wear). Inflatable jacks, chains, batteries, electric motors, gas engines, knives and cutter blades which are sold with Bolting Systems products are not covered by this warranty and instead are warranted as follows:

Inflatable Jacks and electronics are warranted against defects in materials and workmanship for a period of one year from date of purchase.

Consumable parts or accessories, including without limitation, chains, batteries, knives and cutter blades are warranted against defects in materials and workmanship for a period of one year from date of purchase.

All electric motors and gas engines are separately warranted by their respective manufacturer under the terms and conditions stated in their separate warranty.

The foregoing warranties do not cover ordinary wear and tear or any product or part that has been worn out, abused, heated, ground or otherwise altered, used for a purpose other than that for which it was intended or used in a manner inconsistent with any instructions regarding its use.

To qualify for warranty consideration, return the Bolting Systems product, freight prepaid, to a Bolting Systems authorized repair center or to the SPX FLOW factory. If any product or part manufactured by SPX FLOW found to be defective by SPX FLOW, in its sole judgment, SPX FLOW will, at its option, either repair or replace such defective product or part and return it via best ground transportation, freight prepaid. THIS REMEDY SHALL BE THE EXCLUSIVE REMEDY AVAILABLE FOR ANY DEFECTS IN THE PRODUCTS OR PARTS MANUFACTURED AND SOLD BY SPX FLOW OR FOR DAMAGES RESULTING FROM ANY OTHER CAUSE WHATSOEVER, INCLUDING WITHOUT LIMITATION, SPX FLOW'S NEGLIGENCE. SPX FLOW SHALL NOT, IN ANY EVENT, BE LIABLE TO ANY BUYER FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY KIND, WHETHER FOR DEFECTIVE OR NON-CONFORMING GOODS, NEGLIGENCE, ON THE BASIS OF STRICT LIABILITY OR FOR ANY OTHER REASON.

SPX FLOW's Warranty is expressly limited to persons who purchase Bolting Systems products or parts for the resale or for use in the ordinary course of the buyer's business.

THIS WARRANTY IS EXCLUSIVE, AND SPX MAKES NO OTHER WARRANTY OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCTS MANUFACTURED AND SOLD BY IT, WHETHER AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER MATTER. No agent, employee, or representative of SPX FLOW has any authority to bind SPX FLOW to any affirmation, representation, or warranty concerning Bolting Systems products or parts, except as stated herein.

The purpose of this exclusive remedy shall be to provide the buyer with repair or replacement of products or parts manufactured by SPX FLOW found to be defective in materials or workmanship or negligently manufactured. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as SPX FLOW is willing and able to replace said defective products or parts in the prescribed manner.

POWERTHON™ LIFETIME WARRANTY

CUSTOM PRODUCTS AVAILABLE

SPANNER LINK & REACTION ROLLER



- For low height applications.
- For radially close applications
- Open ended spanner configurations
- Multi-plate applications for extreme low height applications
- Reaction 'roller' rolls around flange periphery during operation
- Manufactured to order

RING TENSIONER



- Custom tensioners designed to meet specific applications needs.

THREADED PISTON TENSIONERS



THREADED PISTON TENSIONERS FOR WIND TURBINE LOAD CHECKS

- Compact size
- High load
- Simple assembly
- Cost effective
- Light-weight and flexible
- Manufactured to order

TWHC ACCESSORIES



CUSTOM WRENCH ACCESSORIES AVAILABLE

Should our standard reaction device be unsuitable, SPX FLOW can design special reaction devices and drives upon request.

Contact your SPX FLOW representative for details on any of these custom products or we can develop a custom product for your application.

SPXFLOW

> Bolting Systems™

CIS LTD.
HYDRAULIC SOLUTIONS

