DSI UNDERGROUND
A SANDVIK COMPANY

22 Tonne Tensioner Information Pack

For 15.2 [mm] & 17.8 [mm] DSI Underground Cable Bolts

Contents

1. T41 Tensioners – General Note on Changes to Parts and Procedures

This note details the changes made by DSI Underground to both the range of hydraulic cable-bolt tensioners, and to the procedures used when refurbishing tensioners on behalf of clients. By making these changes DSI Underground can manufacture and refurbish hydraulic tensioners and ensure they comply with the highest safety standards in Australia.

1.1 Design Standards Applicable to Hydraulic Tensioners

DSI Underground has always designed, manufactured and supplied tensioners that have conformed to the requirements of AS2671 – Hydraulic fluid power – General requirements for systems (2002), AS2788 – Pneumatic fluid power – General requirements for systems (2002), and SAE J1273 – Recommended practices for hydraulic hose assemblies (2014). These standards are general in nature, and apply to hydraulic and pneumatic systems used across a range of industries and applications.

In 2010 the NSW Department of Industry and Investment – Mine safety released MDG 41 Guideline for Fluid Power System Safety at Mines. This guideline is both more prescriptive and more relevant for hydraulic plant that is designed for use at mine sites. Further, this guideline exceeds the previous requirements for hydraulic tensioners used at NSW mine sites.

DSI Underground has made changes to ensure that all DSI Underground hydraulic tensioners comply with the requirements of the more rigorous MDG 41 guideline.

Given the nature of the changes, and as a supplier of both new and refurbished tensioners, DSI Underground must provide information about:

- The purpose for which the plant was designed or manufactured
- The results of any calculations, analysis, testing or examination
- Any condition necessary for the safe use of the plant
- Any alterations or modifications made to the plant

The above points are requirements listed in Managing the Risks of Plant in the Workplace (Safe Work Australia Code of Practice, 2012). This information is discussed in more detail in the T41 tensioner booklet.

1.2 Changes to T41 Hydraulic Tensioner Parts and Procedures

Briefly, part changes to the tensioner units relate to hydraulic hoses, fittings and couplers, and the seal kit for the piston. The procedure for assembly of new tensioner units, and the refurbishing of tensioners has been changed to ensure all tensioners leaving DSI Underground are MDG 41 compliant. For clarity, all DSI Underground T41 tensioners are supplied with a certificate stating MDG 41 compliance (page 22 and 23 of this document).

Please note: Use of alternative hoses, seals, and fittings may result in the tensioner unit being non-compliant to MDG 41 guidelines. It is always recommended to service the tensioner unit with DSI Underground, or a DSI Underground approved service provider.

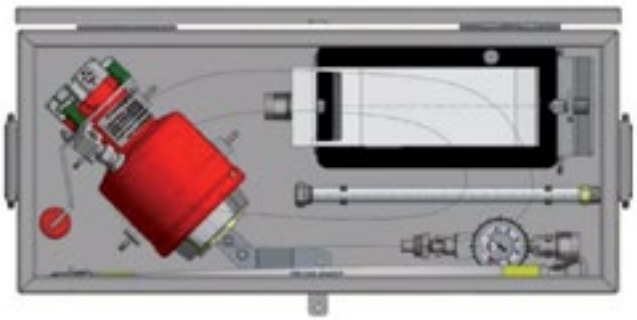
2. Data Sheet

Hydraulic Tensioner Product Guide

Product Code	Cable Type	Included Accessories
[–]	[mm]	[–]
TEN152APACK	15.2	Tensioner, 22T pump, hose, gauge, transport box
TEN152AUNIT	15.2	Tensioner and hose only (no accessories)
TEN178APACK	17.8	Tensioner, 22T pump, hose, gauge, transport box
TEN178AUNIT	17.8	Tensioner and hose only (no accessories)

Hydraulic Tensioner Physical Properties

Cable Type	Max. Tension	Relief Valve	Power Unit	Tensioner Weight
[mm]	[tonne]	[bar]	[–]	[kg]
15.2	22	280	ENERPAC	11.45
17.8	22	280	ENERPAC	11.45



Key Features

DSI Underground tensioners are designed to safely tension DSI Underground cables, and have been independently designed and tested to comply with NSW MDG 41 Guideline for Fluid Power System Safety at Mines. The DSI Underground tensioner set consists of a hydraulic tensioner unit, foot operated compressed air-hydraulic pump, and 4.5 [m] long hydraulic hose with a calibrated pressure gauge.
Key features include:

- Practical and good ergonomic design, with one step removable jaws for simple maintenance
- Designed, manufactured and serviced to comply with AS2671, AS2788, J1273 & MDG 41
- System hydraulic pressure is limited by a safety relief valve contained in the foot pump
- Upgrades to MDG 41 compliance are available for previous versions of the tensioner

Note: DSI Underground is quality assured to ISO 9001:2015, registration No.QMS 41328

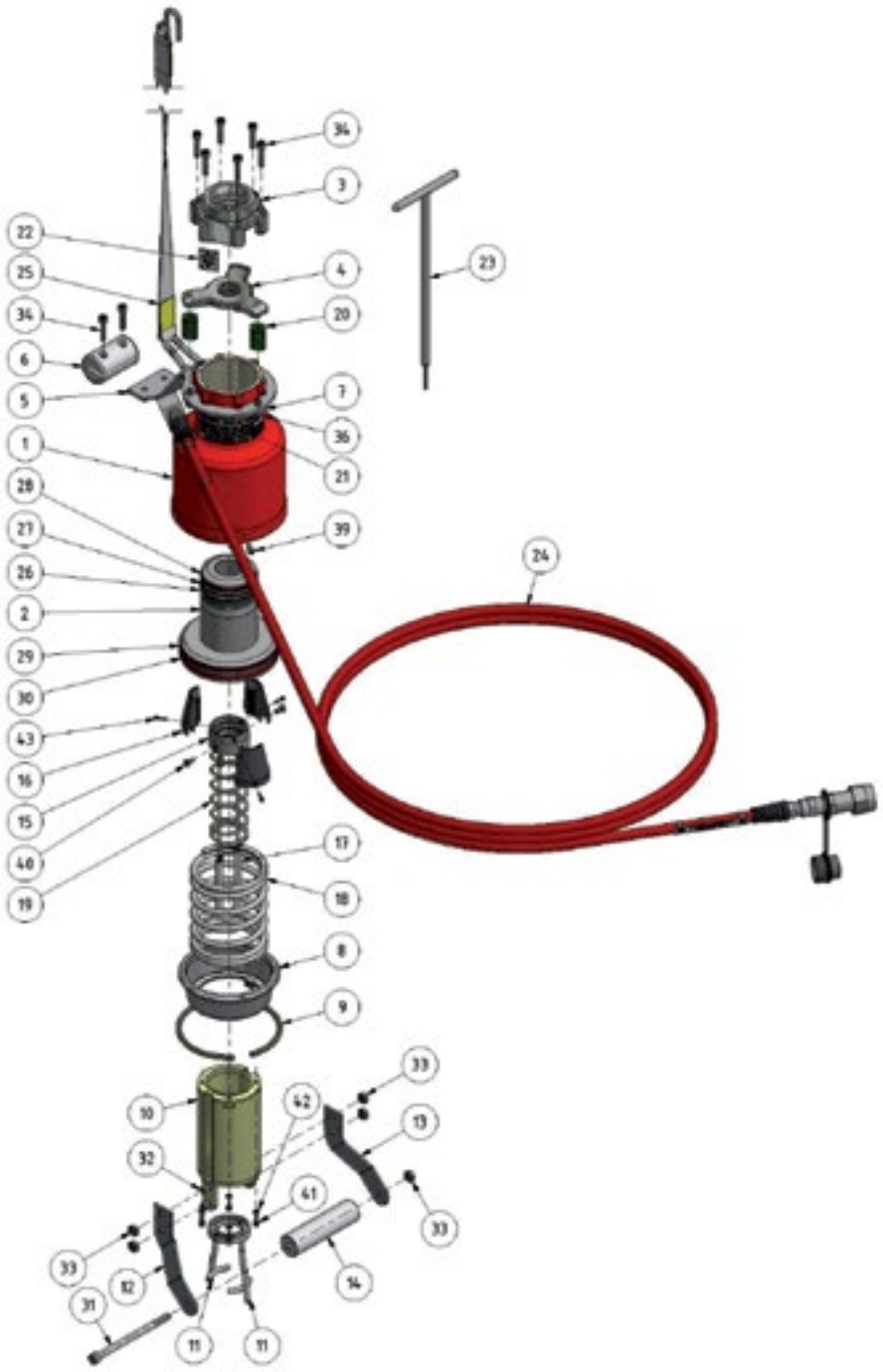
3. Complete Part Description and Product Code List

Item	Quantity	Description	Product Code
1	1	Tensioner unit outer cylinder (all sizes)	TENPOCR01
2	1	Piston (all sizes)	TENPIPN01
3	1	Tensioner unit 15.2 [mm] nose piece	TEN152PNPE02
		Tensioner unit 17.8 [mm] nose piece	TEN178PNPE02
4	1	Spring plate 15.2 [mm]	TEN152PSPE03
		Spring plate 17.8 [mm]	TEN178PSPE03
5	1	Top handle mounting plate (all sizes)	TENPTHMP04
6	1	Upper grip handle (white) 15.2 [mm]	TEN152PUGHW05
		Upper grip handle (green) 17.8 [mm]	TEN178PUGHG05
7	4	Capture lug (all sizes)	TENPCLG06
8	1	Spring retainer (all sizes)	TENPSRR04
9	1	Spring ring (all sizes)	TENPSRG05
10	1	Handle guide barrel (all sizes)	TENPGBL06
11	2	Spring holder (all sizes)	TENPSHO07
12	1	Lower handle left hand arm (all sizes)	TENPLHLA08
13	1	Lower handle right hand arm (all sizes)	TENPLHRA09
14	1	Lower handle (white) 15.2 [mm]	TEN152PLHW10
		Lower handle (green) 17.8 [mm]	TEN178PLHG10
15	1	Spring keeper (all sizes)	TENPSKR01
16	3	Tensioning jaw 15.2 [mm]	TEN152PTJS02
		Tensioning jaw 17.8 [mm]	TEN178PTJS02
17	1	Jaw release cord assembly (all sizes)	TENPJRC03
18	1	Main compression spring (all sizes)	TENPMSG11
19	1	Jaw spring (all sizes)	TENPJSG04
20	3	Die spring – extra heavy duty (all sizes)	TENPDSPG07
21	1	Main name plate 15.2 [mm]	TEN152PMNP03
		Main name plate 17.8 [mm]	TEN178PMNP03
22	1	Short nose piece bolt tail notification plate (all sizes)	TENPBTNP04
23	2	T' bar allen key, 3 [mm] A/F (all sizes)	TENPTBAR05
24	1	Hydraulic hose 700 [bar] C/W 3/8" NPTF female coupler	TEN700AHH280
25	1	Elite 150 [kg] mining strap (all sizes)	TENPSTRAP150KG
26	1 of each	Bearing strip (wear band) 9.7 [mm] wide x 2.5 [mm] THK x 225 [mm] LG	TENPSEALKIT01
27		Pressure seal dia. 2.875" x 2.5" x 0.187"	
28		Wiper seal dia. 2.875" x 2.5" x 0.187"	
29		Pressure seal dia. 5" x 4.5" x 0.25"	
30		Wiper seal dia. 5" x 4.5" x 0.25"	
31	1	Soc HD cap screw M8 x 130 LG – class 12.9	SHCSM8X130
32	4	Soc HD button screws M8 x 16 LG – class 12.9	SHCSBM8X16
33	5	Hex nut M8 – class 8	N08EZ
34	8	Soc HD cap screw M6 x 30 LG – class 12.9	SHCSM6X30
35	1	Soc HD cap screw M6 x 25 LG – class 12.9	SHCSM6X25
36	3	Soc HD cap screw M6 x 20 LG – class 12.9	SHCSM6X20
37	1	Washer flat plain M6	WASHERM6EZ
38	1	Hex nut M6 – class 8	N06EZ
39	2	Soc HD button screws M5 x 12 LG – class 12.9	SHCSBM5X12
40	2	Flat HD soc screw M5 x 12 LG – class 12.9	SHCSCM5X12
41	4	Soc HD cap screw M4 x 10 LG – class 12.9	SHCSM4X10
42	4	Spring washer M4	WASHSP04EZ
43	3	Flat HD soc screw M3 x 14 LG – class 12.9	SHCSCM3X14

4. Tensioner Drawings Parts

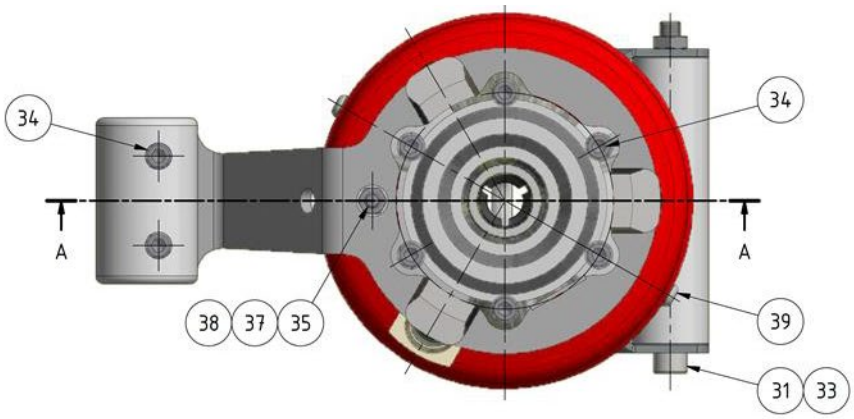
Drawing 1: Tensioner (Components, Fittings, Couplings and Hoses)

	Tensioner Size 15.2 [mm]	Tensioner Size 17.8 [mm]
DSI Underground product code	TEN152AUNIT	TEN178AUNIT
Handle colour	White	Green

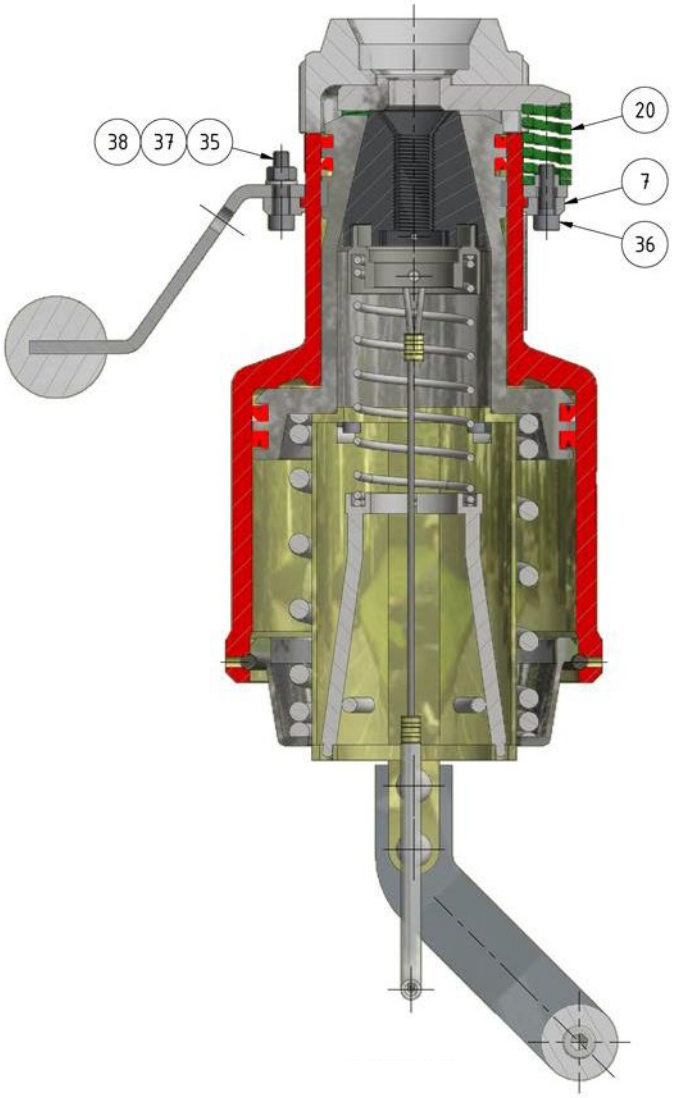


Drawing 2: Tensioner Plan and Section Views

Plan View

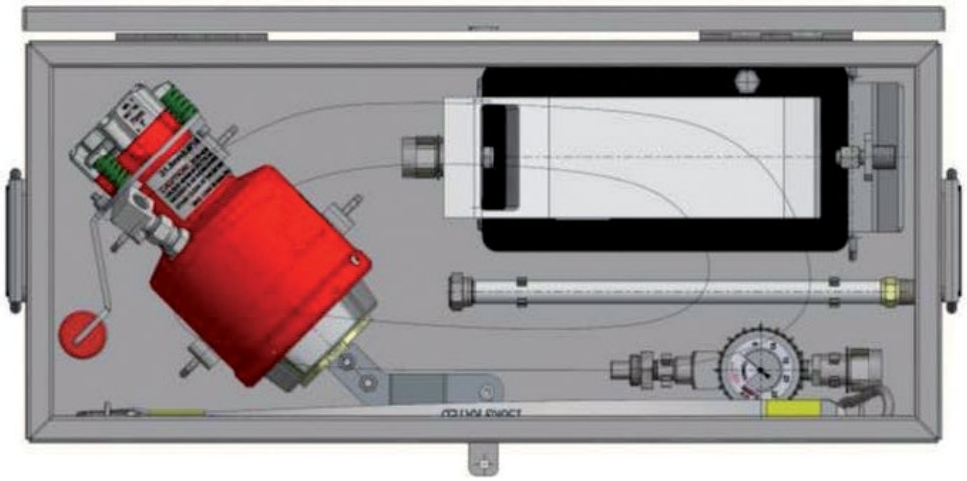


Section View (Section A-A)



Drawing 3: Tensioner Box Contents and Arrangement

	Tensioner Size 15.2 [mm]	Tensioner Size 17.8 [mm]
DSI Underground product code	TEN152APACK	TEN178APACK



Please note: For visual purposes hose has been hidden in above images. Kit comes with hose.

Drawing 4: Tensioner Jaw Assembly

	Tensioner Size 15.2 [mm]	Tensioner Size 17.8 [mm]
DSI Underground product code	TEN152APJA03	TEN178APJA03

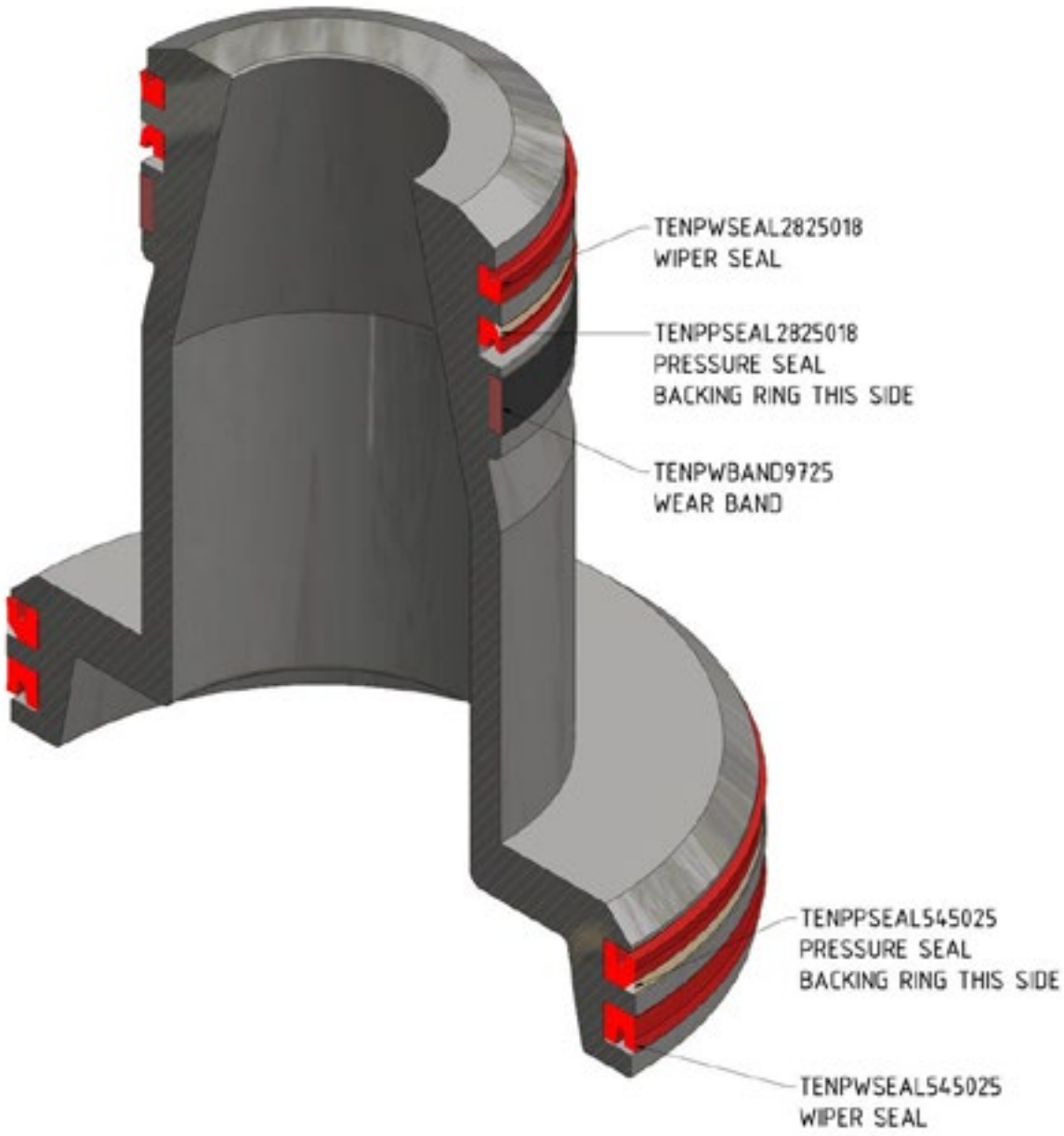
Drawing 5: Tensioner Jaws (3 Segments, Screws and Allen Key)

	Tensioner Size 15.2 [mm]	Tensioner Size 17.8 [mm]
DSI Underground product code	TEN152PTJS02	TEN178PTJS02

Please note: Internal ring not included

Drawing 6: Tensioner Seal Kit for all Tensioners

	Tensioner Size 15.2 [mm]	Tensioner Size 17.8 [mm]
DSI Underground product code	TENPSEALKIT01	TENPSEALKIT01



Please note: Not available individually

Drawing 7: 700 [bar] Hydraulic Hose

	Tensioner Size 15.2 [mm]	Tensioner Size 17.8 [mm]
DSI Underground product code	TEN700AHH280	TEN700AHH280

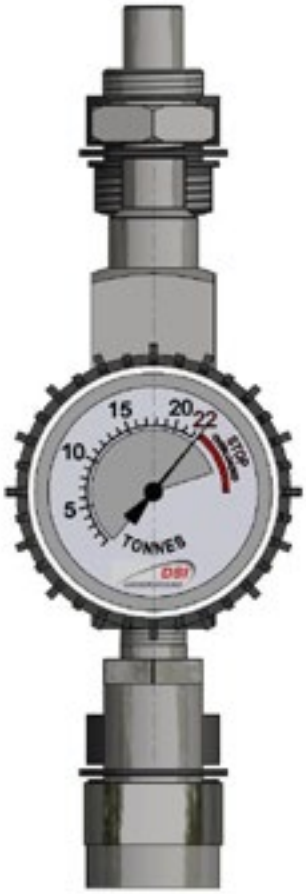
c/w 700 [bar] rated fittings, MDG 41 burst sleeve & 3/8" NPTF female coupler

Drawing 8: 22 [tonne] / 280 [bar] Hydraulic Foot Pump Assembly

	Tensioner Size 15.2 [mm]	Tensioner Size 17.8 [mm]
DSI Underground product code	TEN280AHFP02	TEN280AHFP02

Drawing 9: 22 [tonne] / 280 [bar] Force Gauge Assembly

	Tensioner Size 15.2 [mm]	Tensioner Size 17.8 [mm]
DSI Underground product code	TEN280AFGA03	TEN280AFGA03



5. T41 Tensioner Operation Safety Advice

The following safety advice provides users of the T41 tensioner set with a list of hazards identified with use of the set. It provides a starting point for operators when assessing the site-specific hazards of any job requiring the use of the tensioner set.
It is recommended that all users understand all relevant safety and operating instructions before starting any work using the tensioner set. The following nonspecific hazards were identified for using a hydraulic tensioner in an underground mining setting:

- Be aware of the trip hazard created by the hydraulic hose joining the pump and the tensioner.
- Never position yourself (or allow anyone else to be positioned) directly behind, above or below a tensioner unit when in use. Lanyards may also be used for additional protection should the tensioner unit internals fail and the body of the tensioner be ejected from the bolt.
- Do not use the tensioner if gripping wedges (jaws) are worn excessively, the hose cover is damaged, the pressure gauge is inoperable, or other defects are observed. Worn jaws could result in failure to attain full load or tensioner jaw slippage at load. Damaged hoses could result in either poor operation caused by leaks or blockages, or sudden hydraulic pressure loss due to hose rupture. Incorrect pressure application could occur if gauges are faulty or inoperable.
- It is recommended that operators wear personal protective equipment (hard hats, safety glasses, safety boots, gloves and long sleeves, etc.) while operating equipment to avoid minor injury. It is noted that most sites have a minimum PPE standard when working underground.
- Do not handle or hold pressurised hoses during tensioning. Escaping oil under pressure can penetrate the skin. If oil is injected under the skin seek medical attention immediately. All DSI Underground T41 tensioner packs are supplied with hose burst-sleeves offering additional protection.
- Only DSI Underground supplied power units should be used to operate the tensioner. The hydraulic hose connecting the air-hydraulic pump power unit has a warning tag “Hose only to be used with DSI Underground Tensioners at Rated Tensioner Pressure” this tag must not be removed. The air-hydraulic pump has limit valves to ensure the tensioner unit will not receive excessive hydraulic pressure.
- Never exceed the maximum allowable tensioning load of 20 or 30 [tonne]. Exceeding the maximum load could result in leaks/failure of the hydraulic circuit, or failure of the bolt.
- Lift equipment only by the handles. Using the hydraulic hoses for moving, carrying or adjusting equipment may cause damage to the hydraulic system, and may expose operators to the risk of hydraulic fluid injection if the hydraulic system is pressurised.
- Care should be taken to keep the internals of the tensioning equipment clean from dirt and grease. Dirty or greasy tensioner jaws may reduce the amount of load applied to the cable, and it may also affect the operation of the moving parts of the tensioner.

This is not an exhaustive list of possible hazards when using the tensioning set. The site should follow its own hazard assessment methods before using, and during use of, the tensioner unit.

6. Operator Installation Guide

The installation guide provides the customer with generic instructions when using the T41 tensioner set. However, DSI Underground is unable to identify all the site-specific hazards. For this reason, it is mandatory that the customer evaluate the environment in which the tensioner will be used and determine effective hazard controls.

6.1 Installation Guide Disclaimer

Products supplied by DSI Underground comply with DSI Underground's specifications. DSI Underground does not claim that its products will be fit for the user's intended use. The full range of conditions under which DSI Underground products are to be used have not been assessed by DSI Underground and must be assessed and monitored by each user.

The effectiveness of DSI Underground products will be affected by various factors, including mine conditions, mine temperature, product temperature, product storage and transportation conditions, strata control design, and the skill and experience of the user. In the case of DSI Underground bolt installations, resin and bolt storage conditions, bolt hole size, length and quality, bolt profile, bolt pre-load, bolt encapsulation, resin spin time, and resin hold time, are just some of the critical factors to proper installation and good performance. Similarly, in the case of T41 tensioner units, the bolt installation parameters will affect the effectiveness and safety of using the tensioner, as well as factors such as the tensioner specification, condition, and maintenance; in addition to site strata conditions, operator skill and experience.

This installation guide only contains general information relevant to installation of DSI Underground products. The user assumes all responsibility and liability arising from the use of DSI Underground products or reliance on this installation guide. DSI Underground is committed to maintaining current and accurate information and this installation guide is subject to change without notice. Please contact us for further information regarding our product performance, quality, specifications, testing and installation.

6.2 Operator Installation Guide

The following installation guide provides general recommendations when using a DSI Underground T41 tensioner set to pre-tension correctly installed DSI Underground cables. It is important to note that each of the T41 tensioner units (and specifically the "nose" plate and jaw assembly) is only compatible with a single cable diameter and its complementary barrel and wedge. This compatibility is listed in Table 1.

Table 1. List of T41 Tensioner, Cable and Barrel and Wedge Compatibility

Tensioner Description	Product Code	Compatible Cable	Product Codes
15.2 [mm] cable tensioner	TEN152AUNIT	15.2 [mm] Ø cable, with 42 [mm] Ø barrel & wedge anchor	CBSP080C BLW15003
17.8 [mm] cable tensioner	TEN178AUNIT	17.8 [mm] Ø cable, with 50 [mm] Ø barrel & wedge anchor	CB1780 BLW17803
21.8 [mm] cable tensioner	TEN218AUNIT	21.8 [mm] Ø cable, with 56 [mm] Ø barrel & wedge anchor	ULA810W BLW21803D
23.5 [mm] cable tensioner	TEN235AUNIT	23.5 [mm] Ø cable, with 56 [mm] Ø barrel & wedge anchor	AFC4810SDL1 AFC-L1
28.0 [mm] cable tensioner	TEN280AUNIT	28.0 [mm] Ø cable, with 65 [mm] Ø barrel & wedge anchor	HTC8P2B082025C BLW2803D

6.2.1 Handling and Transport of Tensioner Unit

The weight of a complete tensioner set in its carry box is approximately 45 [kg]. Thus, it is recommended that two persons carry the boxed tensioner set. The hydraulic tensioner unit itself weighs approximately 12 [kg] without hoses, etc. Thus, care is required when handling the unit to avoid strain and crush injuries. Damage to the tensioner unit have occurred in the past when passing tensioner units across the conveyor of continuous mining machines as well as damage to the fittings, hoses and unit itself. Both these outcomes are to be avoided if production delays are to be minimised.

6.2.2 Air Supply and Connections

It is important that DSI Underground supplied power units are used to operate the tensioner. The hydraulic hose connecting the air pump to the hydraulic tensioner unit has a warning tag “Hose only to be used with DSI Underground Tensioners at Rated Tensioner Pressure”.

The tensioner unit as supplied from DSI Underground will provide a maximum of either 22 or 30 [tonnes] of tension load in the cable. This maximum load is controlled by a pressure relief valve (located in the air-hydraulic pump) which restricts the oil pressure to either 280 or 380 [bar] (4,000 or 5,500 [psi]) for 22 [tonne] and [30 tonne] kits respectively. Without correct operation of this relief valve, the pump (driven by compressed air of typically 6 [bar]/87 [psi]) is capable of developing oil pressure as high as 690 [bar] (10,000 [psi]). This amount of load could fail either the tensioner internals (jaws) or the cable tail itself.

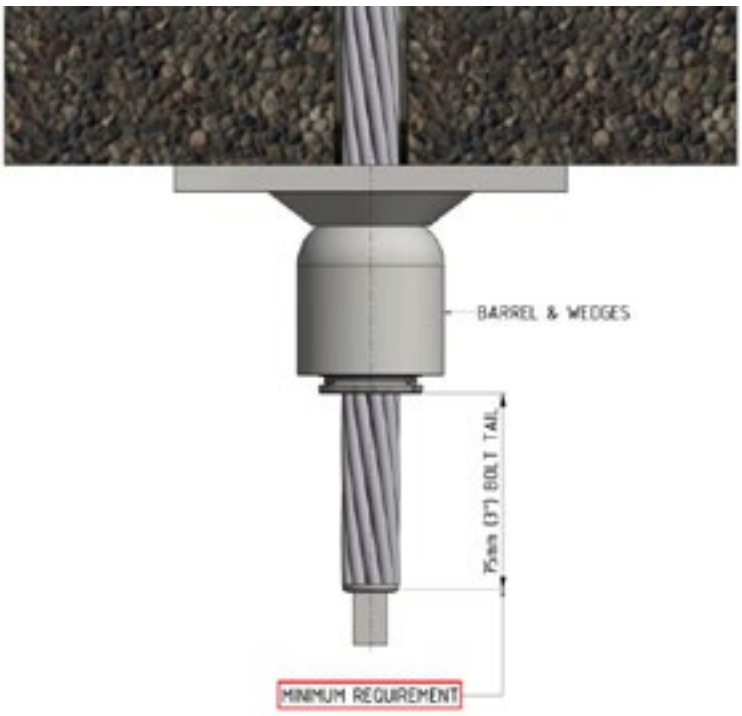
It is therefore important that the operator watches the pressure gauge while tensioning so that in the unlikely event of failure of the pressure relief valve, the pre-set maximum load of either 22 or 30 [tonnes] is not exceeded.

Before use, confirm the foot pump airline and air supply is free of contaminates such as water as this can damage the foot pump unit. The ½" BSPT connection for air supply hose to the foot pump are to conform to mine site regulations (be it QLD, NSW or TAS). Check hydraulic lines for condition and that they are full of hydraulic fluid.

6.2.3 Bolt and Accessory Installation

Install the DSI Underground cable in accordance with the recommended procedure. Fit the plate, and barrel and wedges so that they are firmly against the roadway roof (or side/rib). Measure the amount of cable (tail) that protrudes below the barrel and wedges. A minimum tail length of 75 [mm] is recommended to ensure the tensioner jaws have sufficient purchase on the cable to allow safe and effective application of pre-tension (figure 1).

Figure 1. Minimum Tail Length Required for Fitting the Cable Tensioner



6.2.4 Fitting the Tensioner Unit

Step 1: Fit the tensioner unit onto the cable bolt by lifting it until it is firmly against the barrel and wedges (figure 2).

Step 2: Slowly allow the tensioner unit to drop away from the barrel and wedges to engage the jaws.

Step 3: Pull the tensioner unit down slightly whilst supporting it to make sure jaws have gripped the cable bolt.

If the jaws do not grip, re-try steps 1 to 3. If the jaws still do not grip consult section 8: Maintenance.

Caution: The tensioner unit must be fully retracted before fitting to the cable tail. The tensioner unit is fully retracted when the top of the inner cylinder is almost level (3-5 [mm]) with the spring retainer top edge (figure 2). If the unit is not fully retracted activate the return valve in the foot pump.

Before installing the tensioner unit, ensure the bolt tail is clean and free of mud or grease.

Before the air-operated foot pump is used the vent-screw must be opened. The vent-screw is located near the hydraulic outlet port on top of the reservoir (about 1-2 turns). The vent screw should be tightened again for transportation. For more details refer to the pump manual.

It is recommended that at the beginning of each working shift, jaws are removed and checked to ensure they are in a serviceable condition, clean and lubricated (see section 8: Maintenance).

Figure 2. Fitting the Tensioner Unit to a Cable Tail

Push Tensioner Unit up

6.2.5 Tensioning

Tension the bolt to the required load by operating the pump until the required load is observed on the pressure gauge. A calibrated metric tonne pressure gauge is supplied with the kit.

Caution: STAND CLEAR and out of the pulling direction of the tensioner unit whenever tension/pressure is applied (figure 3). In the unlikely event of the bolt or tensioner failing, standing clear of unit will avoid injury if the tensioner and/or cable tail becomes a projectile.

After the required load is reached, release the pressure from the hydraulic ram. In the case of the air-operated foot pump release pressure by pressing the pump treadle.

Figure 3. DO NOT Stand beneath Tensioner Unit when Tensioning

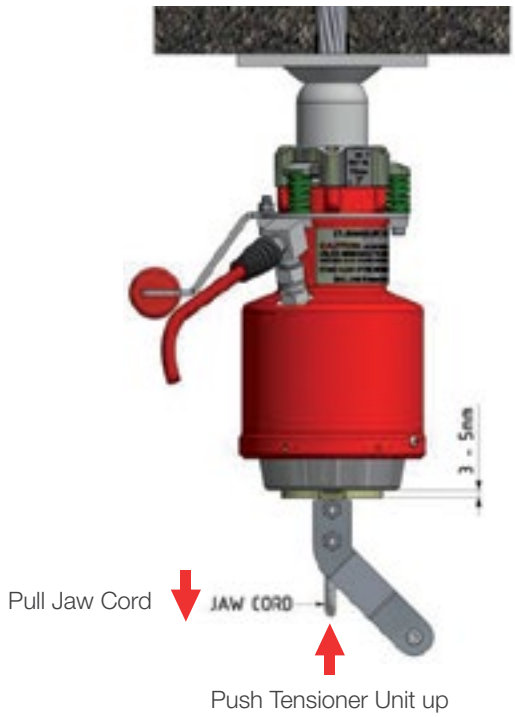
6.2.6 Tensioner Unit Removal

Once the cable bolt has been tensioned to the desired load, release the hydraulic pressure in the tensioner unit.
The tensioner unit can then be removed from the cable tail in the following way:

Step 1: Push the tensioner unit up and at the same time pull the release loop down to disengage the jaws from the cable (figure 4).

It is recommended that at the beginning of each working shift, jaws are removed and checked to ensure they are in a serviceable condition, clean and lubricated (see section 8: Maintenance).

Figure 4. Pull Release Loop to Remove



Step 2: Lower the tensioner unit down gently while holding the release loop (figure 5). Full retraction of the hydraulic ram is not necessary before taking the tensioner unit off the bolt. However, care shall be taken that the hydraulic ram is fully retracted before tensioning the next bolt.

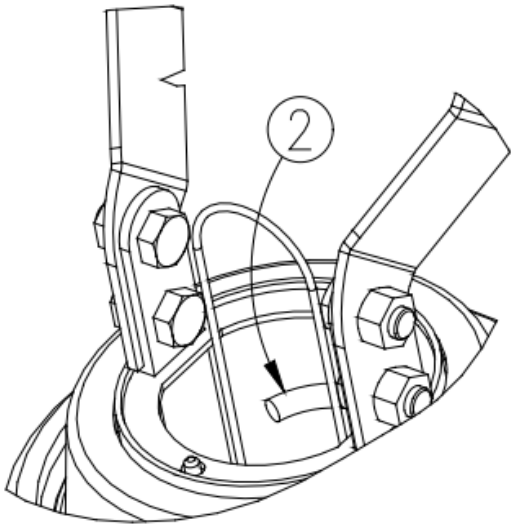
Note: If the tensioner becomes difficult to remove from the bolt, the jaws and the conical piston-mating surface should be cleaned and lubricated (see section 8: Maintenance).

Figure 5. Lower Tensioner

6.2.7 Removal of the Jaws

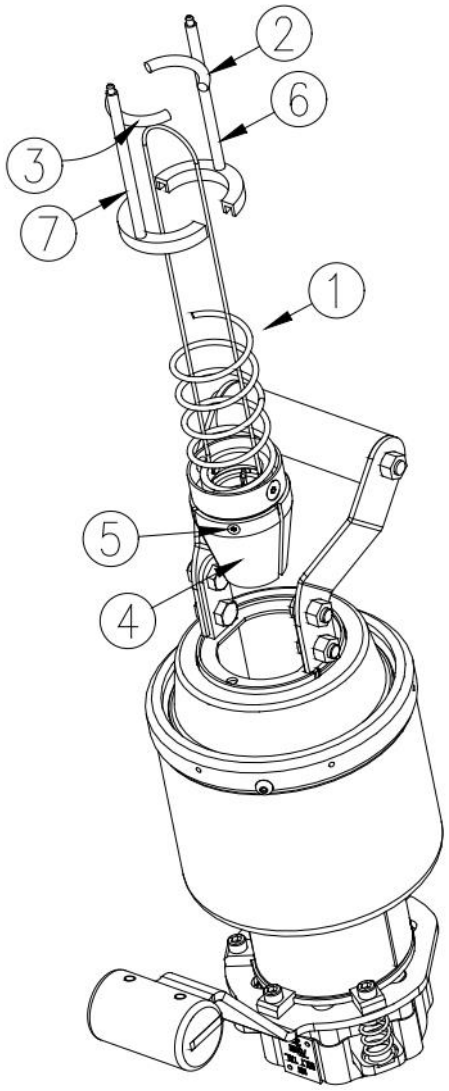
To remove the complete jaw assembly from the tensioner unit, push the spring retaining ring down and tilt it (part 2 in figure 6). To re-install the jaw assembly, use the reverse procedure.

Figure 6. Spring Retaining Ring (2)

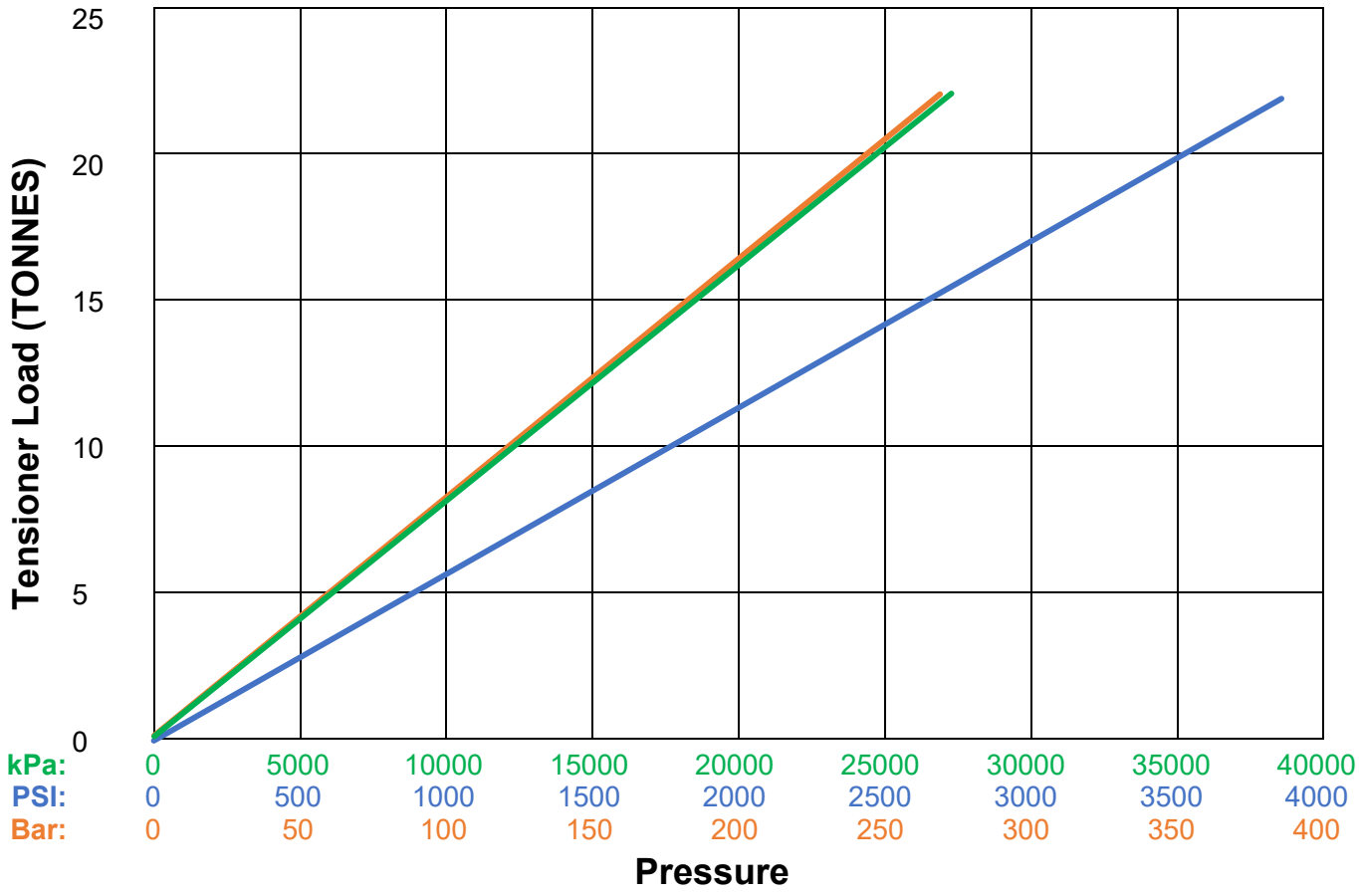


Replace the tensioner jaws (4) by removing three screws (5) using a 2 [mm] allen key (figure 7).

Figure 7. Components of Jaw Assembly



7. Pressure Conversion Table



8. Maintenance

The following guidance is applicable to common field maintenance requirements. More specialised maintenance should be carried out by suitably trained and experienced persons, such as the team of qualified fitters at DSI Underground who have experience building and re-building T41 tensioners.

8.1 Jaw Inspection, Cleaning and Lubrication

After each shift the jaws should be disassembled as described in section 6. Inspect the jaws to ensure there is no dirt left between the jaws and the conical piston surface. Care should be given to the tensioner conical jaws. All dirt should be removed, as dirt can lead to the unit being difficult to remove from the cable bolt, or it may inhibit grip on the cable. Additionally, the three screws used to secure the jaws (section 4: part 42 in drawing 1 (see also drawing 5), and section 6.2.7, part 5 in figure 7) should be checked and tightened with a 2 [mm] allen key. Finally, ensure the conical surfaces of the jaws are lubricated with an anti-seize paste before re-assembling the unit.

8.2 Bleeding of Air from Hydraulic System

If the hydraulic cylinder retraction is slow or jerky, the unit should be bled until free of air. This should be done by:

1. Pumping the tensioner until the ram is fully extended
2. Placing the tensioner on the ground and the pump at a height above the tensioner
3. Opening the return valve of the pump until the ram is fully retracted
4. Repeat this procedure until air is bled

If problems persist contact your DSI Underground representative as soon as practical.

8.3 Pressure Gauge Calibration

Accurate application of pre-tension is controlled by observation of the pressure gauge. The pressure gauge is required to be calibrated annually or after any damage has occurred to the unit. Calibration certification documents are kept within a folder in the tensioner box.

9. Warranty

DSI Underground Cable Bolt Tensioner Set

1. Warranty – Subject to the conditions below,
DSI Underground Australia Pty Limited (ABN: 84 093 424 349) a corporation organised and existing under the laws of Australia, and having its business address at 25 Pacific Highway, Bennetts Green, New South Wales 2290, Australia warrants to the Customer that the Cable Bolt Tensioner Set ("the product") is free from defects in material and workmanship.

2. Customer means original user

2.1 Cable bolt tensioner pack (product codes TEN152APACK for 15.2 [mm] cable bolts & TEN178APACK for 17.8 [mm] cable bolts) shall consist of tensioner unit, foot pump, gauge, hydraulic hose, lanyard, allen key and operating instructions in a carry box. Any component specifically required by the purchaser not part of the DSI Underground range will be governed by the warranties and conditions of their respective manufacturer's warranty, if applicable.

2.2 Replacement parts – DSI Underground will replace F.O.T point of manufacture or other location designated by DSI Underground, any part or parts for warranty which DSI Underground examination show to have failed under normal use and service by the Customer within one (1) year of purchase by original user.

2.3 Notice – DSI Underground's obligation under this warranty is conditional upon it receiving prompt notice of claimed defects, which shall in any event not be later than thirty (30) days following expiration of the one (1) year after the original purchase by original user

2.4. Other products warranty – DSI Underground makes no warranty with respect to parts, accessories or components manufactured by others. The warranty that applies to such items is that offered by their respective manufactures.

2.5 Exclusions – DSI Underground shall not be liable under this warranty if the defect is a result of:

- Damage by the original user or third party
- Incorrect application
- Improper installation or use
- Use of products in a manner not reasonably contemplated by DSI Underground
- Use of products contrary to law
- Subjection of products to unusual or not recommended physical or environmental stress
- Failure or refusal to install engineering changes or enhancements recommended by DSI Underground
- Abuse, neglect, misuse or accident
- Service, repair, alteration or modification by other than DSI Underground or its nominated repairer
- Damaged by other equipment connected to the products
- Affected by incorrect use
- Normal wear and tear

3. Additional cost –

(a) If an inspection by DSI Underground reveals no further obligation on DSI Underground under this warranty, the direct and indirect costs and expenses associated with such inspection shall be borne by the original user.

(b) Any service request arising from causes not covered by the warranty will be subject to DSI Underground's then current service charge.

3.1 Implied Terms – Subject to sub-clause 2, any condition or warranty, which would otherwise be implied in the agreement for sale of the products or this warranty is hereby excluded.

3.2 Where legislation implies in the sale agreement of the products any condition or warranty, and that legislation avoids or prohibits provisions in a contract excluding or modifying the application of or exercise of or liability under such condition or warranty, the condition or warranty shall be deemed to be included in the sale agreement of the products and this warranty. However, the liability of the DSI Underground for any breach of such condition or warranty shall be limited, at the option of the DSI Underground, to one or more of the following:

(c) If the breach relates to goods:

- The replacement of the goods or the supply of equivalent goods
- The repair of such goods
- The payment of the cost of replacing the goods or of acquiring equivalent goods, or
- The payment of the cost of having the goods repaired; and

If the breach relates to services:
the supplying of the services again; the payment of the cost of having the services supplied again.

4. Liability – DSI Underground, the manufacturer of the products, its distributors or dealers shall not be liable to the customer for any loss or damage (including contingent, incidental or consequential loss or damage) which may be suffered or incurred or which may arise directly or indirectly in respect of the goods or services supplied pursuant to a sale agreement of the products or in respect of a failure or omission on the part of DSI Underground to comply with its obligations under any sale agreement of the products.

4.1 Subject to subclause (3) the customer warrants that it has not relied on any representation made by DSI Underground which has not been stated expressly in the sale agreement for the products, or upon any descriptions, illustrations or specifications contained in any document including catalogues or publicity material produced by DSI Underground.

4.2 The customer acknowledges that to the extent that DSI Underground has made any representation, which is not otherwise expressly stated in the sale agreement of the products, the customer has been provided with an opportunity to independently verify the accuracy of that representation.

4.3 The customer shall at all times indemnify and hold harmless DSI Underground and its officers, employees and agents ("those indemnified") from and against any loss (including reasonable legal costs and expenses) or liability reasonably incurred or suffered by any of those indemnified arising from any proceedings against those indemnified where such loss or liability was caused by:

(d) A breach by the customer of its obligations under any sale agreement of the products; or

(e) Any wilful, unlawful or negligent act or omission of the customer.

10. Certificates

10.1 MDG 41 Certification and Calibration Certificates

APT
SPECIALIST HYDRAULICS AND TRAINING

DSI UNDERGROUND

RESIDUAL RISK REVIEW

T-41 CABLE BOLT TENSIONER POWER UNIT, HOSING & CYLINDER

Design is certified as compliant according to MDG-41 (where applicable)

DSI Underground's Cable Tensioner was the subject of a 3rd party design review by APT, according to MDG-41 'Guideline for Fluid Power System Safety at Mines'.

The review incorporated the Cylinder Unit, Power Unit and Hosing design, as detailed within APT document no. 20161107, dated 5/9/16.

Under the scope of this assessment, all design related compliance items have been addressed and operational items have been listed for use within the DSI Underground operating manual for this equipment.

Allan Probert 16/03/2018

for

Allan Probert Training Pty Ltd
8/5 Grattoir Place
Toronto NSW 2287
Email apt@apttraining.com.au
Phone 02 4016 6443

10.2 Inspection Certificate

MAINT-FORM-BG-083
Issue Date: 14/08/2020

Hydraulic Equipment Inspection Certificate

This document is to certify that the hydraulic equipment listed below has been inspected, tested and is fit for purpose when released to the customer.

Product Type: _____

Product Code: _____

Product Serial Number: _____

Condition: **New** **Serviced**

Inspection/Test Type	Result		Comments
Visual	Pass	Fail	
Assembled and load tested	Pass	Fail	
Leak tested	Pass	Fail	
Gauge reading within range	Pass	Fail	
MDG41 compliant fittings, hoses, and sheathing	Pass	Fail	
Tensioner unit retraction rate	Pass	Fail	

Complies to MDG41 standards outlined in ATP Residual Risk Review Certificate 20161107 **YES** **NO**

Inspected by:

Name: _____

Position: _____

Date: _____

Signed: _____

DSI UNDERGROUND
A SANDVIK COMPANY

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