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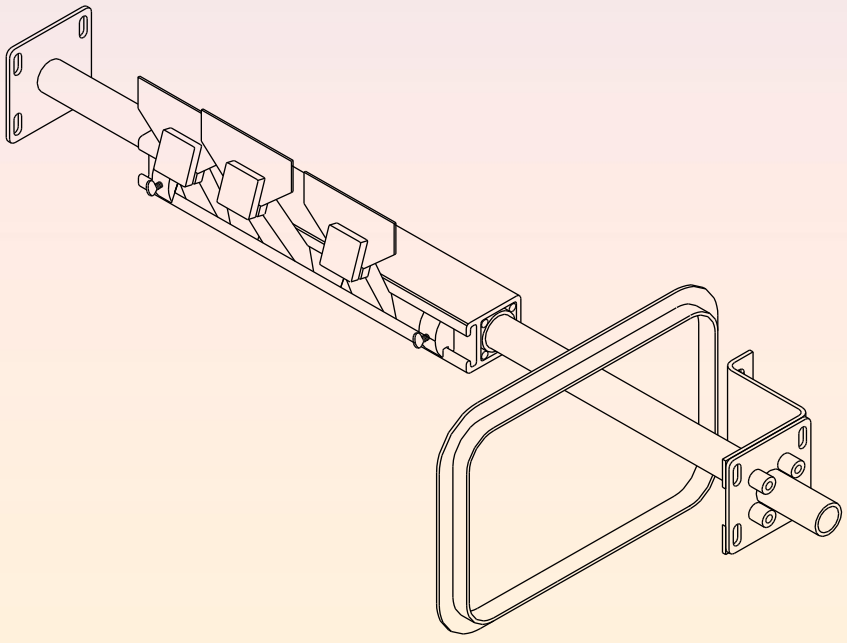
DT Torsion Arm Secondary Cleaner

Installation, Operation & Maintenance Manual



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WARRANTY

ESS* WARRANTS** the **DT Torsion Arm Secondary Belt Cleaner** to be free of defects both in materials and workmanship for a period of 12 months from the date of despatch of the product from the ***ESS factory. The warranty given by ***ESS*** in this regard will extend only to replacing or repairing product shown to be defective.

The warranty also is subject to the following restrictions:

(a) Installation of the product contrary to the instructions contained in the supplied manual will void such warranty absolutely;

(b) The warranty will not extend to any liability for injuries incurred and which result from the use of the product contrary to the instructions in the manual;

(c) Save as prescribed by law, ***ESS*** will not be liable for any damage sustained by a purchaser or a third party by way of consequential loss arising out of defects in the product.

You are asked to note that ***ESS*** offers purchasers a service whereby either:

(a) It will install the product and certify the correctness of such installation, or

(b) Certify the correctness or otherwise of the installation of the product by third parties.

This certification service is designed to ensure that you obtain the full benefit of the ***ESS*** warranty hereby provided. If you would like to take advantage of the installation certification service provided, please contact ***ESS*** regarding the service.

Visit the ***ESS*** website www.esseng.com.au to register your product warranty.

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1.0 SAFETY

All equipment installed on or around a conveyor belt must comply with AS 1755 – 2000 Conveyors – Safety requirements.

The **DT Torsion Arm Secondary Cleaner** is designed to be quickly and easily installed and serviced by appropriate personnel. Ensure that only suitably qualified and trained personnel install and service this product, and that all site and statutory safety procedures are followed.

The conveyor belt and any associated equipment must be shut down and locked out according to plant safety procedures before commencing installation of this equipment or attempting to enter or reach into the conveyor enclosure. Contact with moving conveyor belts can result in serious injury or death.

The following hazards may be present when installing this equipment. Specific locations may also introduce other hazards. Ensure all hazards and potential hazards are identified and controlled.

	Hazard		Hazard
X	Moving Machinery - ISOLATE		Other:
	Hot Work		Other:
	Stored Energy		Other:
	Working at Heights		Other:
	Heavy Lift		Other:
	Persons Working Overhead		Other:
	Persons Working Below		Other:
	Electrical & Cabling		Other:
	Pinch Points		Other:
	Trip Hazards		

Once hazards have been identified, the installer should undertake and document a comprehensive Job Hazard Analysis according to site requirements and good safe-working practice.

The installer must identify hazards and apply appropriate controls before proceeding with the installation of this equipment.

1.1 SAFETY LABELS

Pictograph labels are used to show graphically where potential safety hazards exist around this product. These labels do not represent every possible hazard. They are not intended to be a substitute for safe work practices and good judgment. These labels and *ESS* technical manuals use specific words to identify the severity of the hazard. They are described below. Take time to read and understand the meaning of these words and symbols.

Danger labels call attention to imminently hazardous situations that will result in serious personal injury or death if not avoided. Injury from these hazards is immediate in nature and has a high probability of resulting in a serious or fatal accident if proper precautions are not followed.

Warning labels call attention to potentially hazardous situations that could result in serious personal injury or death if not avoided. Injury from these hazards is usually serious in nature, and a severe or fatal accident can occur if proper precautions are not followed.

Caution labels call attention to potentially hazardous situations that may result in minor or moderate personal injury if not avoided. Injury from these hazards is normally less serious than those from Danger or Warning hazards. However, there is still the potential for an accident resulting in serious injury if proper precautions are not followed.

2.0 INTRODUCTION

The **DT Torsion Arm** is a conveyor belt Secondary Cleaner.

It is normally mounted under the head pulley or elsewhere on the return run of the conveyor belt. The blades of the **DT Torsion Arm** meet the belt at a negative or trailing angle, presenting no snag or danger to the belt or splices.

The **DT Torsion Arm** can be tensioned firmly into the belt to remove the slimy film of fines commonly left by the primary cleaner. The **DT Torsion Arm** is therefore intended to be used in conjunction with a primary cleaner (such as the TM DOCTOR BLADE or the DT) and a suitable spray-wash system where appropriate.

The tensioning force is provided by the Air or Spring Tensioners covered in this manual, or the Twist Tensioner covered by a separate manual.

The metal blades of the **DT Torsion Arm** Secondary Cleaner snap in to urethane arms, which in turn slide into a track. Inspection, tensioning and servicing are simple one-man tasks, able to be performed in minutes.

The conveyor belt drive and any associated equipment must be shut down and locked out according to plant safety procedures before commencing servicing of this equipment or attempting to enter or reach into the conveyor enclosure. Contact with moving conveyor belts can result in serious injury or death.

Important points to remember concerning the **DT Torsion Arm** Secondary Cleaner are:

1. The cleaner is directional - it will clean a belt travelling in the design direction and may be extensively damaged by belt reversal or roll-back.

2. Firm backing of the belt is required. If the cleaner is not installed close to the underside of the head pulley, consider installing a flat return idler over the belt at the blade contact point.

3. For belts greater than 1500mm wide a tensioner is required on both sides to ensure equal blade contact force across the cleaning face.

3.0 PREPARATION FOR INSTALLATION

1. **CHECK INSTALLATION DRAWINGS -** Ensure that you have the correct drawings, manual and equipment for your conveyor(s).

2. **PRE-ASSEMBLE THE CLEANER(S) AND MOUNTS -** Do this in your workshop or similar free area, rather than at the Conveyor. This will enable you to:

   - verify all required equipment is present
   - familiarise yourself with the cleaner assembly
   - plan the installation, reducing installation time.
   - identify potential job hazards and plan appropriate controls to ensure a safe installation.

3. **ASSEMBLE THE NECESSARY TOOLS & SAFETY EQUIPMENT REQUIRED FOR THE INSTALLATION**

4. **OBSERVE THE CONVEYOR WHILE RUNNING AND CONVEYING MATERIAL -**

   - Observe the material trajectory
   - Observe the belt direction - does it reverse or roll back?
   - Observe the belt splice condition
   - Does the belt run true, or track off to one side?
   - Is the Head Pulley out-of-round?

Consult ***ESS*** if any **UNUSUAL** conditions are observed in the above. These conditions may result in recommendation of a different installation position or even a different cleaner.

4.0 INSTALLATION

WARNING

Conveyor must be shut down and locked out before performing any installation or service work requiring entry or reaching into the conveyor enclosure.
If installation is to be done in an enclosed area ensure that all Confined Space work guidelines are followed by suitably trained personnel.
If welding and cutting are required ensure that Hot Work guidelines are followed by suitably trained personnel.

If working at heights, ensure that all guidelines are followed by suitably trained personel.

Ensure all hazards are identified and managed. Failure to adequately manage hazards could result in serious injury or death.

Note 1 For original equipment installation, where cleaner cutouts and brackets have been fabricated into the chute during construction, ignore steps 1 and 2 .

Note 2 Solid backing of the blades is essential to ensure proper operation and efficient cleaning. If it is not possible to mount the cleaner as shown in this chapter, mount the mainframe as near to the head pulley as possible and install an auxiliary idler opposite the point of blade-to-belt contact.

Note 3 For installation on enclosed head pulley chutework, draw all dimension lines on chute wall. In applications where head pulley is not enclosed, use the best available field resources and/or methods to ensure that these critical dimensions are followed for a proper installation - ***ESS*** Hanger Brackets are often ideal in this situation (see fig 1).

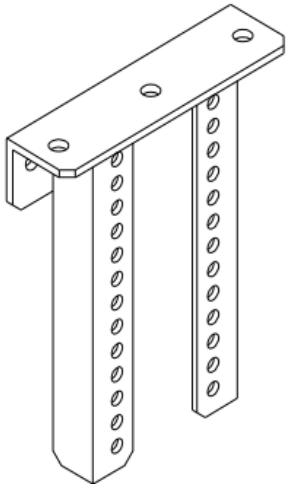


Figure 1 - ESS Hanger Brackets Part Number 09010035(S)

4.1 LOCATING MAINFRAME'S CENTRELINE

Step 1 Refer to figure 2 below. On the outside of the chute, draw a line that represents the underside of the belt, which will be called the Belt Line. Extend this line past the head pulley at the same angle as the belt line.

Draw a line parallel to the belt line, 130mm offset below the belt line.

At the point where the belt leaves the head pulley measure forward a minimum of 25 mm. This will be the contact point for the blade in the short arms. The distance can be any dimension greater than 25mm, as long as the blades contact the belt within the chute (not too close to rear wall), and the belt has sufficient tension to resist excessive deflection when the blades contact.

From the contact point of the short blade extend a line perpendicularly onto the parallel line. From that intersection point, measure back 195mm to a point that will now be the centre point for the **DT Torsion Arm** mainframe. Clearly mark this point with horizontal and vertical centre lines.

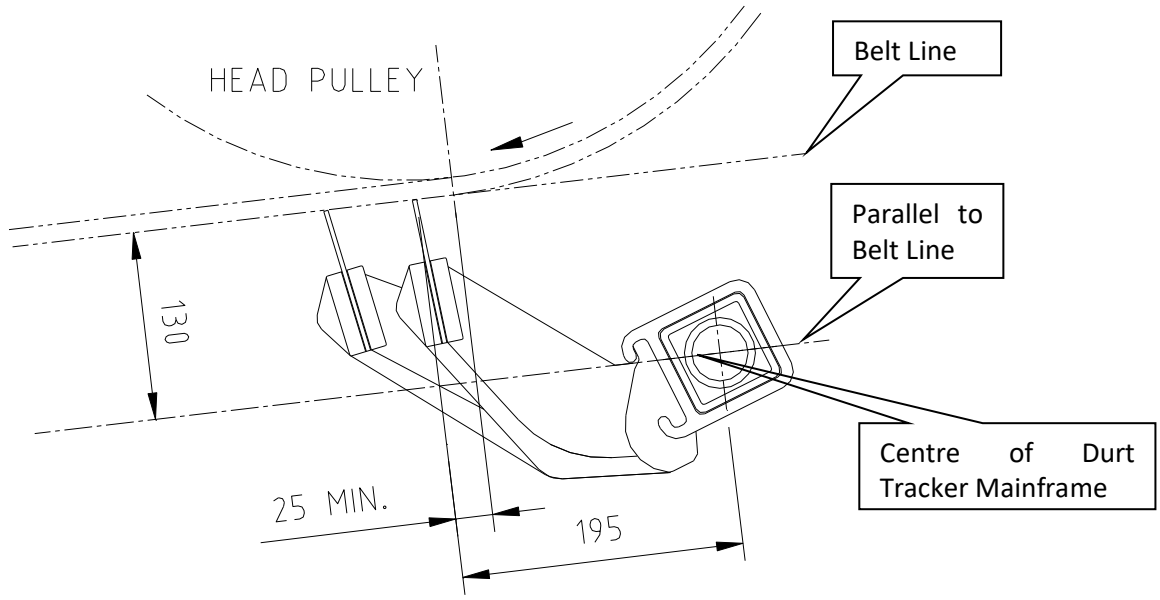


Figure 2 - Installation Position

4.2 VERIFY MAINFRAME POSITION BEFORE PROCEEDING

Step 1 Position the selected tensioner and mount assembly over the centreline marks for the mainframe. Verify that the mounts fit, and that adequate room is available to tension the cleaner. If used, position the ACCESS door frame to ensure it fits. If mounts or door frame interfere with structural members, it may be necessary to locate the cleaner elsewhere on the 130mm offset. If the tensioner only interferes, remember that the tensioner can be rotated to several different mounting positions – refer to Tensioner section. Once mounting position is confirmed, proceed.

Step 2 At the selected mainframe mounting positions, mark out and cut the mainframe and mount fastener holes (if required) in each side of the chute. Refer to the installation drawing at the back of this manual, or if using the Twist Tensioner refer to the separate Twist Tensioner manual.

If a **ACCESS** door is to be installed, use the door frame as a template to mark the door cut-out on the operator side. Proceed to cut the door hole, but ensure that the marked centre lines of the cleaner are not totally removed - you will need these to position the mainframe.

If a stand-off bracket is to be bolted over a **ACCESS** door, the bracket mounting holes also need to be cut.

Step 3 The **DT Torsion Arm** Mainframe is a combination of an extruded polyethylene or formed stainless steel track, a steel tube frame and telescoping mounting pipes. The telescoping mounting pipes allow precise length adjustment each side, removing the need for site trimming.

Remove the cleaner arms if they have been mounted on the mainframe. Do this by loosening and removing the blade lock from the end to be the operator side, and then the cleaner arms by sliding them out of the track.

Insert the mainframe, without the cleaner arms, through the inspection window. Pass one end of the mainframe telescoping pipe through the mount hole on the far side, then the other through the operator side mount.

Step 4 Loosen the lock screws on the bottom of the track, and either extend or retract the telescoping pipe ends as required.

Slide the operator and far side mounts on to the telescoping pipes and loosely bolt the mounts to the chute walls. If a stand-off bracket is to be used over a **ACCESS** door, and the cutout has been made, fit the operator side mount to the appropriate stand-off bracket, and bolt the stand-off bracket in the desired position.

Position the blade track so that it is centred on the belt. Once centred, lightly tighten lock screws on the bottom of the track. This will hold the telescoping pipes in place. This procedure will need to be repeated at the final step.

(Note: Slide the **ACCESS** door frame loosely on to the pipe end before the mount, to save later mount removal).

Step 5 Check the position of the mainframe.

- Is the centre line of the mainframe positioned 130mm from the belt face?
- Is the mainframe level, or equal to the pulley shaft?
- Is there at least 152mm clear at one end of the track to remove and replace blades?

Ensure the far side blade lock is fitted. The lock must be sufficiently secure to hold the blades in place. Slide blade and arm assemblies into the track. Place the operator side blade lock in the track, and secure to finish blade installation. By hand, rotate the pipe until the blade tips lightly contact the belt.

Do the blade tips all touch the belt at the same time?

(Note: Slight inconsistencies in belt thickness, and blade shape, accounting for small gaps between blade and belt, will quickly be taken up by arm flexure on tensioning).

If any questions above have been answered "NO", take appropriate action to correct the installation. If all questions are answered "YES", proceed.

Step 6 Firmly tighten the bolts attaching the cleaner mounts and brackets and weld or bolt the **ACCESS** door frame to the chute wall. Centre the blades on the belt. All ***ESS*** cleaners are designed to clean an area narrower than the actual belt width. This is to allow for a small amount of lateral movement of the belt and to protect the edge of the belt from possible damage. Loosen the lock screws on the bottom of the track and adjust the telescoping pipe ends to the required length. Firmly tighten the lock screws.

Step 7 **WHERE AN ACCESS DOOR IS FITTED.**

Measure the position of the mainframe in relation to the ACCESS door frame. Mark this position on the **ACCESS** door rubber cover, and cut a neat hole, approximately 50mm diameter in the cover. Cut a straight line from this hole to the nearest edge of the rubber cover. Install the rubber cover over the mainframe pipe, and push into place on the door frame. Anchor the loose end of the cover lanyard.

ACCESS doors supplied in recent years will also have a steel mesh safety screen. Cut the mesh to fit neatly around the cleaner mainframe and install the mesh to the door frame. Correctly installed, the mesh will prevent personnel access to the conveyor enclosure, but will allow visual inspections.

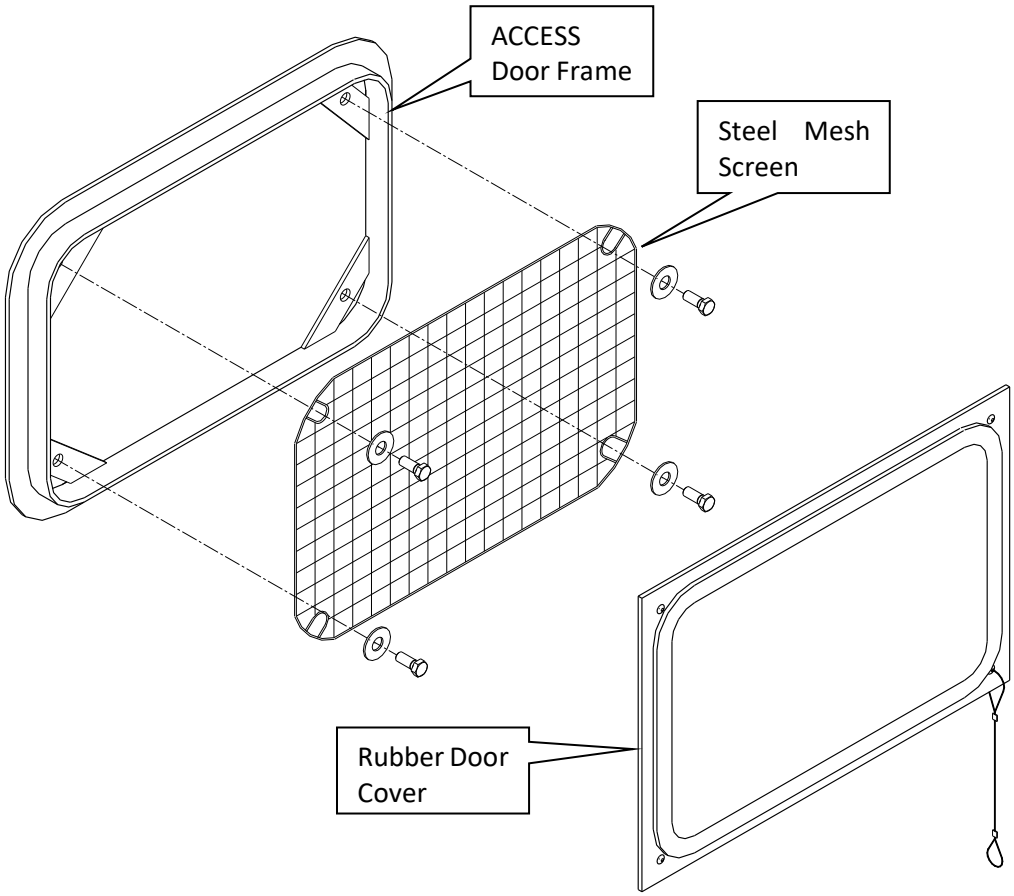


Figure 3 - ACCESS 1218 Access Door

4.2.1 MOUNTING BRACKETS

The **DT Torsion Arm** Secondary Cleaner is mounted to the conveyor structure via TA Mount Plates or Flex Mounts (Figure 3 - ACCESS 1218 Access Door) unless used with a Twist Tensioner (see note below).

The TA Mount Plate is a solid mount with a set of four threaded holes on raised bosses. These are for the attachment of the Spring or Air Tensioner assemblies and the now superseded Pin Tensioner assembly.

The Flex Mount is a steel mount plate with a flexible bush, available in urethane as standard or optional nylon. The Flex Mount was formerly used for the (now superseded) Counterweight Tensioner. A version of the both the Air and Spring Tensioners is available for the Flex Mount.

Both mounting types have the same bolt hole arrangement, but the attachment of the tensioner assembly differs for each one.

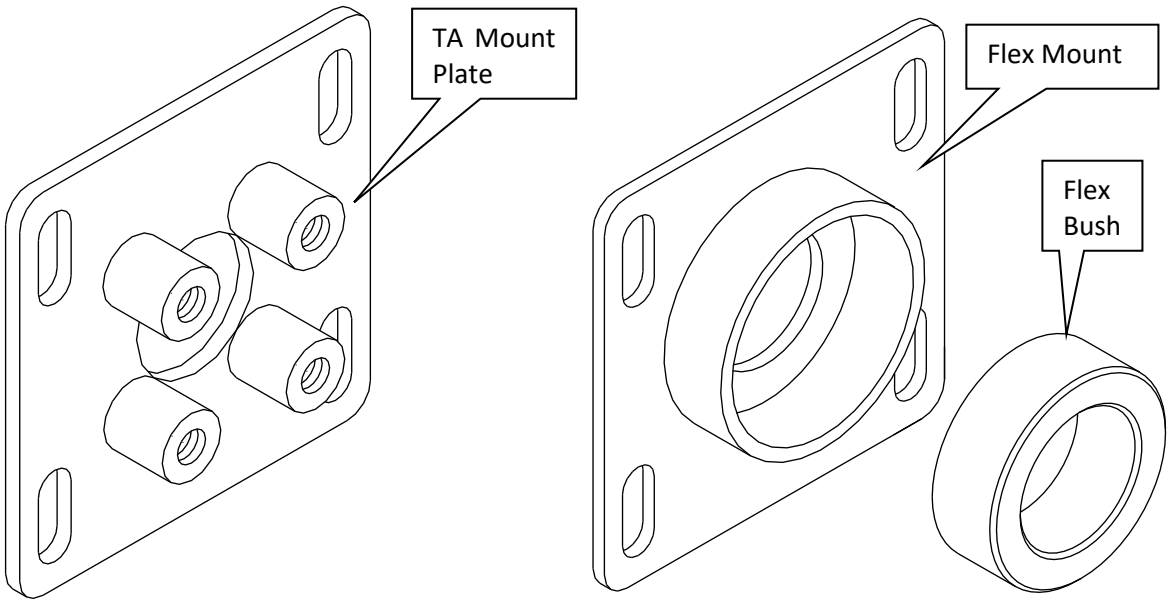


Figure 4 - Mounting Brackets

4.2.2 TWIST TENSIONER

The Twist Tensioner mounts direct to the chute wall or via a special stand-off bracket and has different mount hole centres to the TA and Flex Mounts. The Twist Tensioner is covered by a separate manual that should be read in conjunction with this manual wherever that tensioning unit is used.

4.2.3 AIR TENSIONER

The Air Tensioner can be assembled to tension in either direction and can be rotated to several positions to overcome site restrictions.

The tensioning direction will depend on which side of the chute the tensioner is attached. For larger belts with two tensioners (one each side) the two tensioners will need to be set-up to operate in opposite directions (one clockwise and one anti-clockwise).

The installer needs to be aware of this and ensure that the tensioning direction is correct.

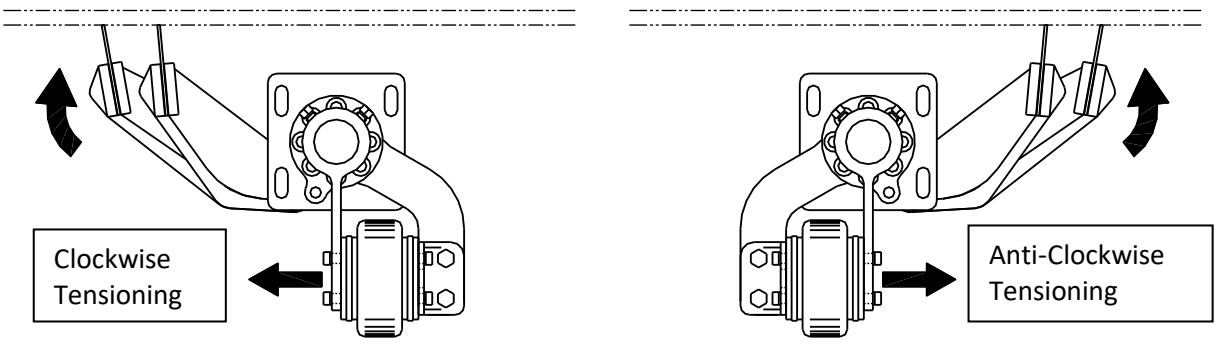


Figure 5 - Air Tensioner Operating Direction

The Air Tensioner is available in two variations:

- Part number 09010101 is an Air Tensioner Assembly suitable for attachment to a Secondary Cleaner TA Mount. This is often used as a retrofit to replace either an ***ESS*** Spring Tensioner or a superseded ***ESS*** Pin Tensioner.

- Part number 09010112 is an Air Tensioner Assembly suitable for attachment to a Secondary Cleaner Flex Mount. This is the most common mount and tensioner combination for a new cleaner, and is also used to replace the superseded ***ESS*** Counterweight Tensioner.

Adding an “S” as a suffix to the above part numbers denotes a stainless steel model.

Both types are available as a set with the mounts included. Where a complete cleaner is ordered, it would normally be supplied with the Flex Mounts as the lower cost option. Refer to the drawings at the back of this manual for more details regarding options.

5.0 INSTALLING THE AIR TENSIONER ON TA MOUNTS

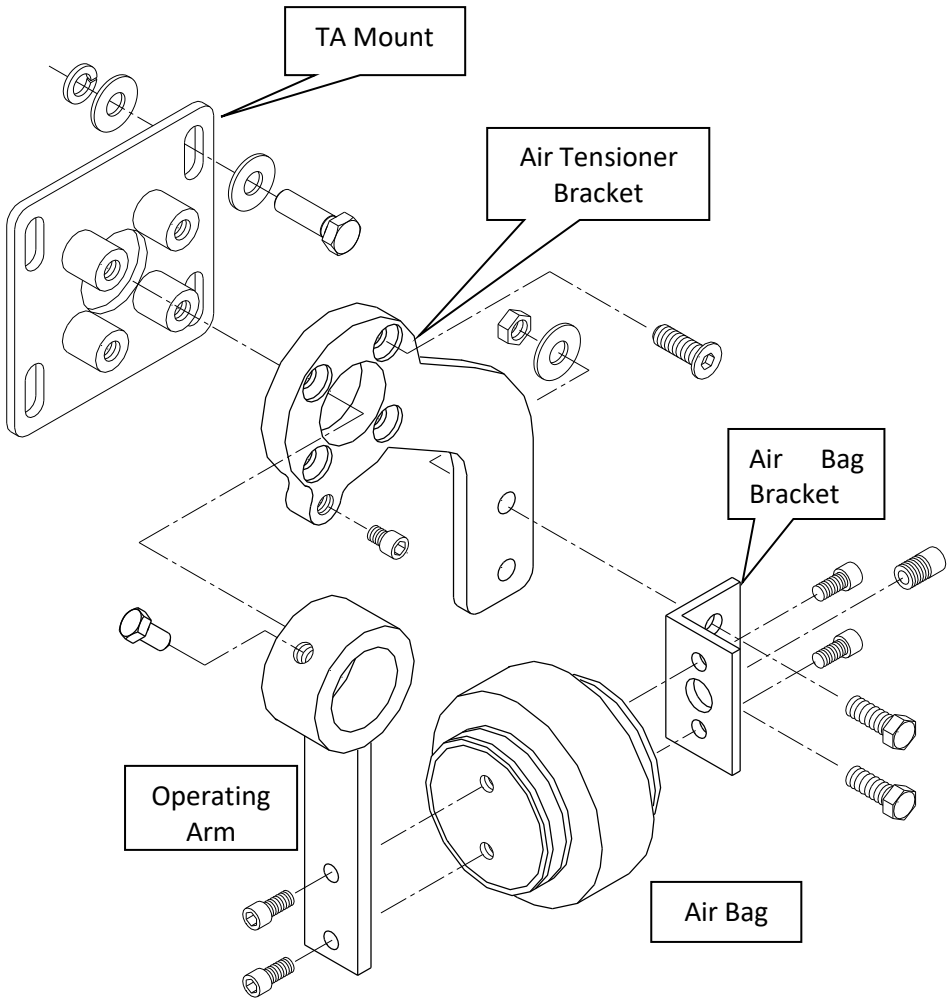


Figure 6 - Air Tensioner 09010101 with TA Mount (not included)

Step 1 Where the installation involves replacing an existing tensioner type, remove the old Tensioner first. To do this, release the operating arm of the tensioner by loosening the lock screws.

The cleaner mainframe may spin suddenly when the tensioner is released. Keep fingers clear – possible twisting hazards are present.

Remove the four countersunk head screws securing the tensioner plate to the mount and remove the tensioner assembly.

Step 2 This is the start point for new installations.

If not already done, fit the Air Tensioner Bracket to the mount using the four countersunk head screws. Ensure that the bracket is in the correct orientation for the

desired tensioning direction. The bracket can be flipped over for the opposite direction. The bracket and the tensioner assembly can also be rotated to four different angles through 360° to suit site restrictions. Attach the airbag bracket to the air tensioner bracket.

Step 3 Attach the blank end of the airbag to the Operating Arm using two x 3/8" socket head screws.

Step 4 Slide the operating arm onto the mainframe with the airbag towards the airbag bracket side of the mount and attach the open end (end with 3 holes) of the airbag to the airbag bracket using two x 3/8" socket head screws.

Step 5 Using a pipe wrench or similar, rotate the cleaner mainframe until the blade tips lightly touch the belt surface at the cleaning position. With the airbag fully compressed, secure the operating arm to the cleaner using the locking screws. Allow 1-2mm clearance between the operating arm and the T.A. Mount to enable free rotation whilst minimising lateral movement.

Step 6 For cleaners on belts 1600mm or wider, repeat the above for the far side. For belts 1500mm and less, simply fit the lock collar onto the far side of the cleaner and secure, again allowing 1-2mm lateral clearance.

Step 7 The cleaner is now ready for attachment of the air supply system. Connect all air fittings using a good quality liquid compound or "Gas Seal" thread tape. Refer to the connection diagram following.

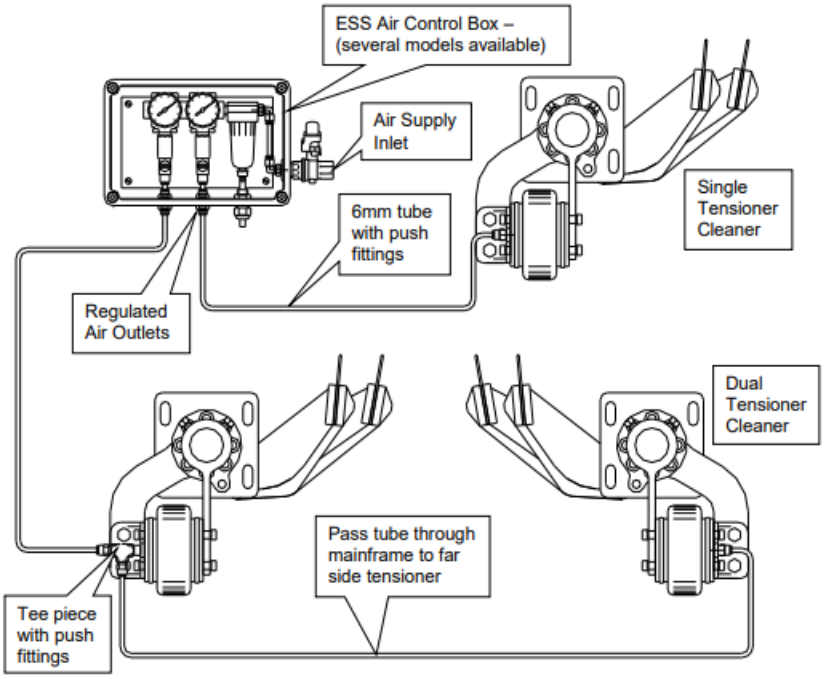


Figure 7 - Air Connections

5.1 INSTALLING THE AIR TENSIONER ON FLEX MOUNTS

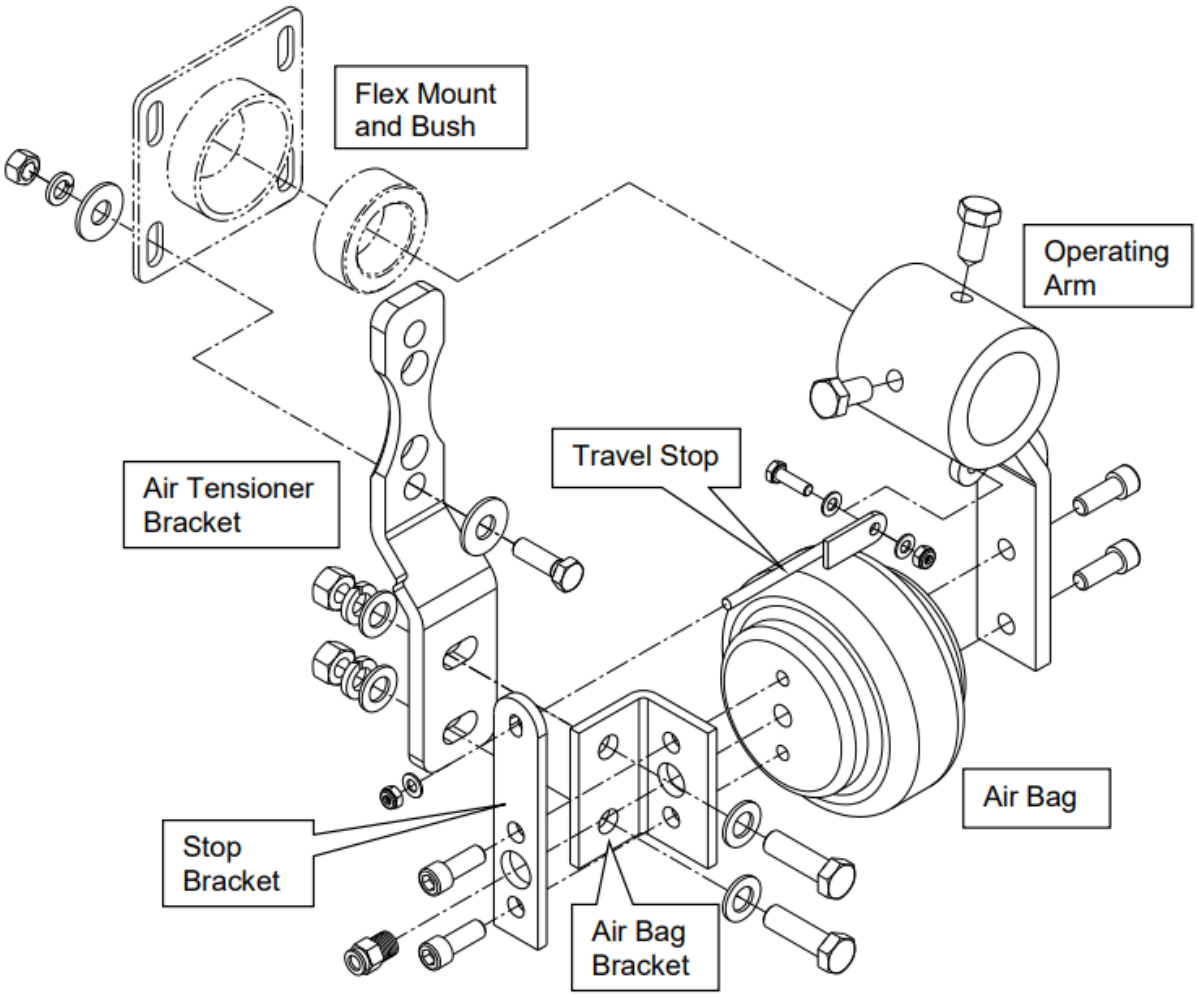


Figure 8- Spring Tensioner Operating Direction

Step 1 Where the installation involves replacing an existing ESS Counterweight Tensioner type, remove the old tensioner first.

WARNING

When releasing the Counterweight Tensioner, the tensioner arm must be supported to prevent sudden rotation of the arm and weight. The cleaner mainframe may also twist suddenly – keep fingers clear. Twisting and impact hazards may be present.

To remove the Counterweight Tensioner, first remove the weight by removing the securing pin, then sliding the weight off the arm. Whilst supporting the arm, loosen the lock screws on the hub of the counterweight arm, then slide the arm off the mainframe. Release the lock screws in the operator side lock collar, and slide it from the mainframe.

Step 2 **This is the start point for new installations.**

Fit the air tensioner bracket to the mount using two of the existing mount bolts. There are M12 bolt holes in the bracket to match the Secondary Flex Mount. Ensure that the bracket is in the correct orientation for the desired tensioning direction. The bracket can be installed on the opposite side mount holes for tensioning in the opposite direction. The bracket and tensioner assembly can also be turned upwards to suit site restrictions. Attach the airbag bracket to the air tensioner bracket.

Step 3 Attach the blank end of the airbag to the Operating Arm using two x 3/8” socket head screws.

Step 4 Slide the operating arm onto the mainframe with the airbag towards the airbag bracket side of the mount and attach the open end (end with 3 holes) of the airbag to the airbag bracket. Ensure that the Stop Bracket is installed at the same time and secured with the same two x 3/8” socket head screws.

Step 5 Fit the Travel Stop Rod to the Operating Arm with the M6 screw provided. Pass the other end through the Stop Bracket and fit the nyloc nut and washer. This prevents over-extension of the airbag.

Step 6 Using a pipe wrench or similar, rotate the cleaner mainframe until the blade tips lightly touch the belt surface at the cleaning position. With the airbag fully compressed, secure the operating arm to the cleaner using the locking screws. Allow 1-2mm clearance between the operating arm and the T.A. Mount to enable free rotation whilst minimising lateral movement.

Step 7 For cleaners on belts 1600mm or wider, repeat the above for the far side. For belts 1500mm and less, simply fit the lock collar onto the far side of the cleaner and secure, again allowing 1-2mm lateral clearance.

Step 8 The cleaner is now ready for attachment of the air supply system. Connect all air fittings using a good quality liquid compound or “Gas Seal” thread tape. Refer to the connection diagram in section 5.2.1 Air Tensioner, Figure 7.

5.2 AIR TENSIONER SETTINGS

Use these inflation pressures as a guide only. Belt speed, material, number of cleaners on belt and acceptable blade wear should be taken into account when setting pressures.

Avoid over-pressuring the cleaner. This will lead to poor performance, excessive blade wear and possible damage to components.

BELT WIDTH	PRESSURES	
	Kpa	PSI
450	48	7
600	76	11
750	97	14
900	124	18
1050	145	21
1200	145	21
1350	165	24
1500	165	24
1600	*97	*14
1800	*110	*16
2000	*131	*19
2200	*159	*23
2400	*179	*26

Table 1 - Air Tensioner Pressure Settings

* - Dual tensioners fitted - pressure per tensioner given (Generally connected by balance tube, ensuring pressure equalisation).

5.3 SPRING TENSIONER

The **Spring Tensioner** is a simple, robust and reliable blade tensioning unit. It can be assembled to tension in either the clockwise or anti-clockwise direction and has multiple mounting positions for each direction.

The tensioning direction will depend on which side of the chute the tensioner is attached. For larger belts with two tensioners (one each side) the two tensioners will need to be set-up to operate in opposite directions (one clockwise and one anti-clockwise).

The installer needs to be aware of this and ensure that the tensioning direction is correct.

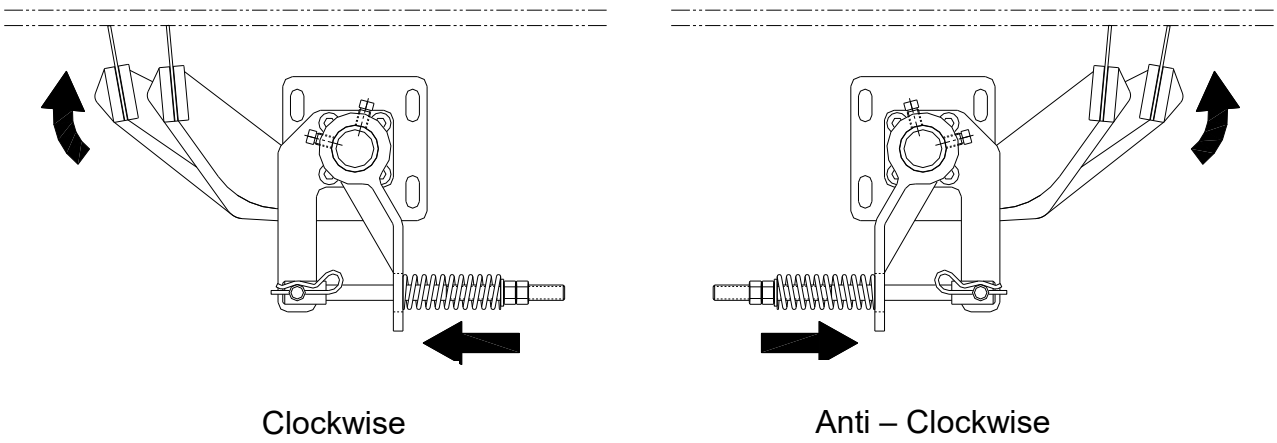


Figure 9 - Spring Tensioner Operating Direction

The Spring Tensioner is available in two variations:

- **Part number 09010309** is a Spring Tensioner Assembly suitable for attachment to a Secondary Cleaner TA Mount. This is often used as a retrofit to replace either an ***ESS*** Air Tensioner or a superseded ***ESS*** Pin Tensioner.
- **Part number 09010310** is a Spring Tensioner Assembly suitable for attachment to a Secondary Cleaner Flex Mount. This is the most common mount and tensioner combination for a new cleaner, and is also used to replace the superseded ***ESS*** Counterweight Tensioner.

Adding an "S" as a suffix to the above part numbers denotes a stainless steel model.

Both types are available as a set with the mounts included. Where a complete cleaner is ordered, it would normally be supplied with the Flex Mounts as the lower cost option. Refer to the drawings at the back of this manual for more details regarding options.

5.4 SPRING TENSIONER INSTALLATION ON TA MOUNT

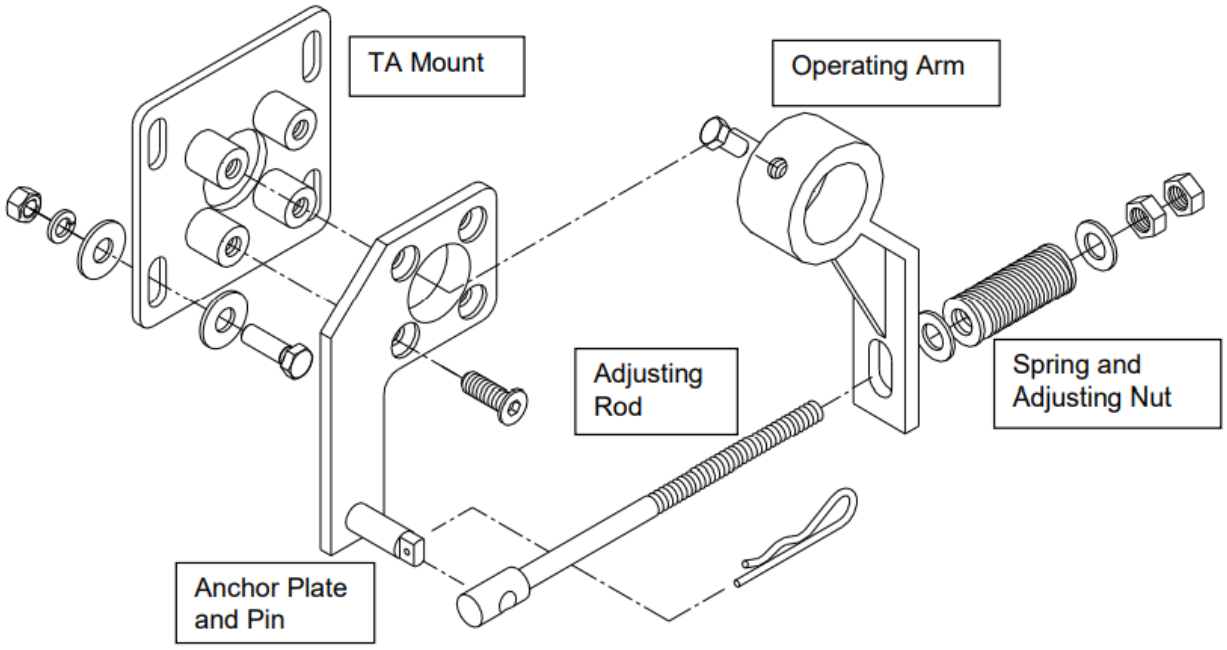


Figure 10 - Spring Tensioner Assembly 09010309 with TA Mount (not included)

Step 1 Where the installation involves replacing an existing tensioner type, remove the old tensioner first. To do this, release the operating arm of the tensioner by loosening the lock screws.

WARNING **The cleaner mainframe may spin suddenly when the tensioner is released. Keep fingers clear – possible twisting hazards are present.**

Remove the four countersunk head screws securing the tensioner plate to the mount and remove the tensioner assembly.

Step 2 **This is the start point for new installations.**

If not already done, fit the anchor plate to the mount using the four countersunk head screws. Ensure that the plate is in the correct orientation for the desired tensioning direction. The anchor plate can be flipped over for the opposite direction, but the anchor pin must be removed and installed on the other side. The anchor plate and the tensioner assembly can also be rotated to four different angles through 360° to suit site restrictions.

Step 3 Slide the operating arm onto the cleaner mainframe, again ensuring that it is in the correct orientation for the desired tensioning direction.

Step 4 Insert the threaded end of the adjusting rod through the operating arm slot, with the clevis end toward the anchor plate.

Step 5 Fit the adjusting rod clevis onto the pivot plate pin and secure with clip provided.

Step 6 Fit spring, nut and locknut to the threaded end of the adjusting rod. Only run the adjusting nut a few turns onto the adjusting rod. Do not try to adjust or compress the spring yet.

Step 7 Using a pipe wrench or similar, rotate the cleaner until the blade tips are lightly touching the belt. With the operating arm fully retracted against the spring, lock the operating arm onto the cleaner mainframe by tightening the two lock screws. Ensure that the operating arm hub is 1-2mm clear of the mount to allow free rotation without excessive lateral movement of the mainframe.

Step 8 Whilst still supporting the cleaner with the pipe wrench, adjust the nut (not locknut) against the spring until the spring just begins to compress. Release the pipe wrench.

Step 9 For belts 1500mm and wider, tensioners are fitted to both sides. Repeat above procedure for other side. For cleaners with one tensioner only, fit the locking collar onto the far end of the cleaner mainframe, again locking it into position 1-2mm clear of the mount.

5.5 SPRING TENSIONER INSTALLATION ON FLEX MOUNT

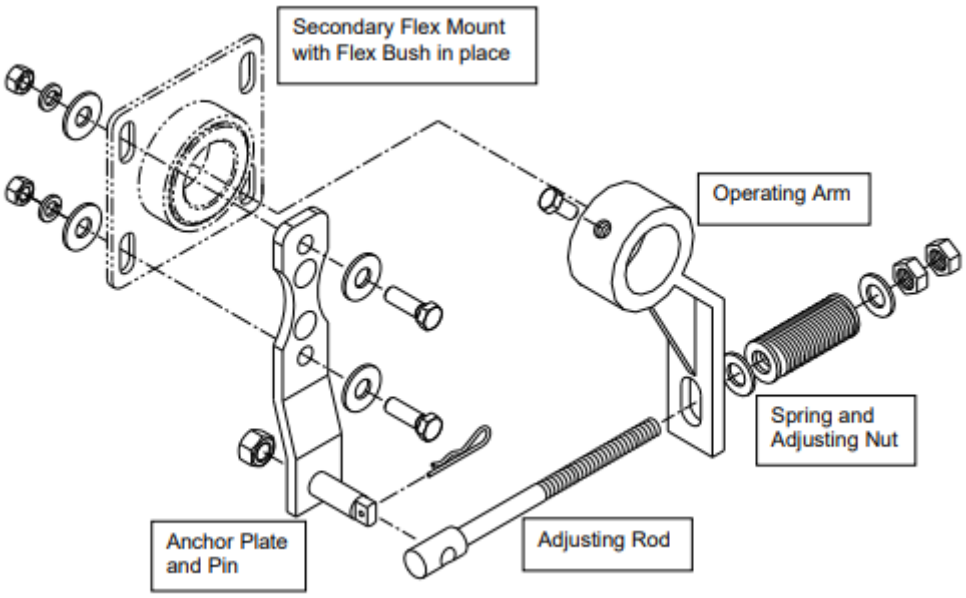


Figure 11 - Spring Tensioner 09010310 with Flex Mount (not included)

Step 1 Where the installation involves replacing an existing ***ESS*** Counterweight Tensioner type, remove the old tensioner first.

WARNING

When releasing the Counterweight Tensioner, the tensioner arm must be supported to prevent sudden rotation of the arm and weight. The cleaner mainframe may also twist suddenly – keep fingers clear. Twisting and impact hazards may be present.

To remove the Counterweight Tensioner, first remove the weight by removing the securing pin, then sliding the weight off the arm. Whilst supporting the arm, loosen the lock screws on the hub of the counterweight arm, then slide the arm off the mainframe.

Release the lock screws in the lock collar, and slide it from the mainframe.

Step 2 **This is the start point for new installations.**

Fit the anchor plate to the mount using two of the existing mount bolts. There are M12 bolt holes for the Secondary Flex Mount. Ensure that the plate is in the correct orientation for the desired tensioning direction. The anchor plate can be installed on the opposite side mount holes for tensioning in the opposite direction. The anchor plate and tensioner assembly can also be turned upwards to suit site restrictions.

Step 3 Slide the operating arm onto the cleaner mainframe, again ensuring that it is in the correct orientation for the desired tensioning direction.

Step 4 Insert the threaded end of the adjusting rod through the operating arm slot, with the clevis end toward the anchor plate.

Step 5 Fit the adjusting rod clevis onto the pivot plate pin and secure with clip provided.

Step 6 Fit spring, nut and locknut to the threaded end of the adjusting rod. Only run the adjusting nut a few turns onto the adjusting rod. Do not try to adjust or compress the spring yet.

Step 7 Using a pipe wrench or similar, rotate the cleaner until the blade tips are lightly touching the belt. With the operating arm fully retracted against the spring, lock the operating arm onto the cleaner mainframe by tightening the two lock screws. Ensure that the operating arm hub is 1-2mm clear of the mount to allow free rotation without excessive lateral movement of the mainframe.

Step 8 Whilst still supporting the cleaner with the pipe wrench, adjust the nut (not locknut) against the spring until the spring just begins to compress. Release the pipe wrench.

Step 9 For belts 1500mm and wider, tensioners are fitted to both sides. Repeat above procedure for other side. For cleaners with one tensioner only, fit the locking collar onto the far end of the cleaner mainframe, again locking it into position 1-2mm clear of the mount.

5.6 SPRING TENSIONER ADJUSTMENT PROCEDURE

The Spring Tensioner is mounted externally to the conveyor chute, and as such is normally able to be adjusted with the conveyor in service. Under no circumstances should any person reach into or enter a conveyor enclosure while the belt is running. For any conveyor belt cleaner service, maintenance or adjustment that requires entry to the conveyor enclosure by any part of the body, first ensure that the conveyor is shut down and locked out to site safety procedures.

Contact with moving conveyor components can result in severe injury or death.

To adjust the Spring Tensioner:

- Loosen the locknut away from the adjusting nut on the adjusting rod.
- Turn the adjusting nut until the cleaner blades are pressed against the belt, and the spring begins to compress.
- Continue until the spring is compressed to the length shown in the following table 1. Ensure that the correct length is used for the appropriate belt width. If in doubt, contact ***ESS***.
- Once the correct spring compression is achieved, run the locknut up against the adjusting nut, and use two wrenches to tighten the nuts together.
- For cleaners with dual tensioners, repeat this procedure on the opposite side.

Table 2 – Spring Tensioner Settings

Belt Width	Spring Compresed Length	Number of Turns
450	86	6.25
600	83	7.5
750	76	10
900	76	10
1050	76	10
1200	73	11.25
1350	70	12.5
1500	86**	6.25**
1600	83	7.5
1800	76	10
2000	76	10
2200	70	12.5
2400	70	12.5

Table 2 - Spring Tensioner Settings

** Note: Cleaners for belts 1500 and wider have dual tensioners. The settings shown are for each tensioner.

6.0 COMMISSIONING

Step 1 Ensure that the cleaners are correctly adjusted against the belt as described in the previous sections.

Step 2 Ensure that all foreign materials, tools and rubbish have been removed from the belt and the immediate area.

Step 3 Start the conveyor, following all appropriate safety start-up procedures.

Step 4 Observe the action of the cleaner blades. Ensure that there is no vibration in the blades or mainframe. Ensure that all blades are contacting the belt evenly. Ensure that there is no marking of the belt surface from the cleaner blades. Refer to the Trouble Shooting section or contact ***ESS*** if any problems are observed.

Step 5 If possible, observe the operation of the cleaner once the belt is loaded. Observe the cleaning action of the blades. Is the belt clean after the cleaner? If not, check the cleaner adjustment again, referring to the appropriate tensioner section. If problems persist, contact ***ESS***.

Step 6 Shut down the conveyor. Correct any problems observed. Re-test if necessary. The cleaner is now ready for production.

Step 7 Ensure that all operators / maintenance personnel are trained and familiar with the safety requirements, safe work practices and the operating and maintenance procedures for this cleaner.

7.0 MAINTENANCE

Regular inspection and servicing is the key to effective conveyor belt cleaning. It is recommended that the cleaner be inspected once per week. Actual service intervals will vary considerably from plant to plant.

The conveyor belt drive and any associated equipment must be shut down and locked out according to plant safety procedures before commencing servicing of this equipment or attempting to enter or reach into the conveyor enclosure. Contact with moving conveyor belts can result in serious injury or death.

Step 1 Inspect the condition of the cleaner. Open the inspection door (if fitted) and observe the condition and action of the blades and cleaner. **DO NOT REMOVE THE MESH SAFETY SCREEN.**

Step 2 If necessary (and if plant rules allow it), hose any material build-up from the blades or mainframe. **DO NOT REMOVE THE MESH SAFETY SCREEN.**

Step 3 If necessary, adjust the cleaner tension setting - refer to INSTALLING THE AIR TENSIONER ON TA MOUNTS 5.

7.1 BLADE SERVICING:

Step 1 Shut down and lock out the conveyor.

Step 2 Remove the ACCESS Door rubber cover. Release the tension (Refer to Tensioner Section 5) and back the blades away from the belt:

- Visually inspect the blades.
- If blades are clean, and not excessively worn, re-tension the cleaner.
- If material build-up is still present or blades are excessively worn, proceed.

Step 3 Remove the safety mesh screen to access the cleaner. Remove the operator side blade lock and slide the blade assemblies from the track, taking note of the removal order.

Step 4 Clean and inspect the blades. If blades are in good condition, go to step 5. If blades are excessively worn, remove and replace with new blades. If arms are damaged, replace the full set.

Step 5 Re-install blades and arm assemblies into the mainframe track. For re-used blades install in the same position – see step 3. Fit the blade lock after the last arm, ensuring that the arm assemblies are in good contact. Re-tension the cleaner as previously described.

Step 6 Remove locks or tags and restart belt. Observe cleaner action and blade effectiveness. Replace ACCESS door safety screen and cover - if fitted. Clean up work area.

8.0 TROUBLE SHOOTING

PROBLEM - Blades and arm vibrate.

CAUSE	SOLUTION
Incorrect installation dimensions	Check installation and if necessary move cleaner closer to belt
Belt deflected upward on tensioning of cleaner	Install an idler roller over the belt at the belt contact point
Belt vibration being transferred to cleaner	Install an idler roller over the belt at the blade contact point

PROBLEM - Mainframe bent.

CAUSE	SOLUTION
Mainframe undersized	Stiffened mainframe may be required. Contact *ESS* for assistance
Excessive tension	Relax blade tension to maximum tension recommended in tensioner section 5.
Material build-up between blades, mainframe and belt	Increase frequency of inspection and service. Add water spraybar.
Normal deflection	A small amount of deflection is considered normal. Contact *ESS* if excessive deflection occurs

PROBLEM - Higher blade wear rate than estimated.

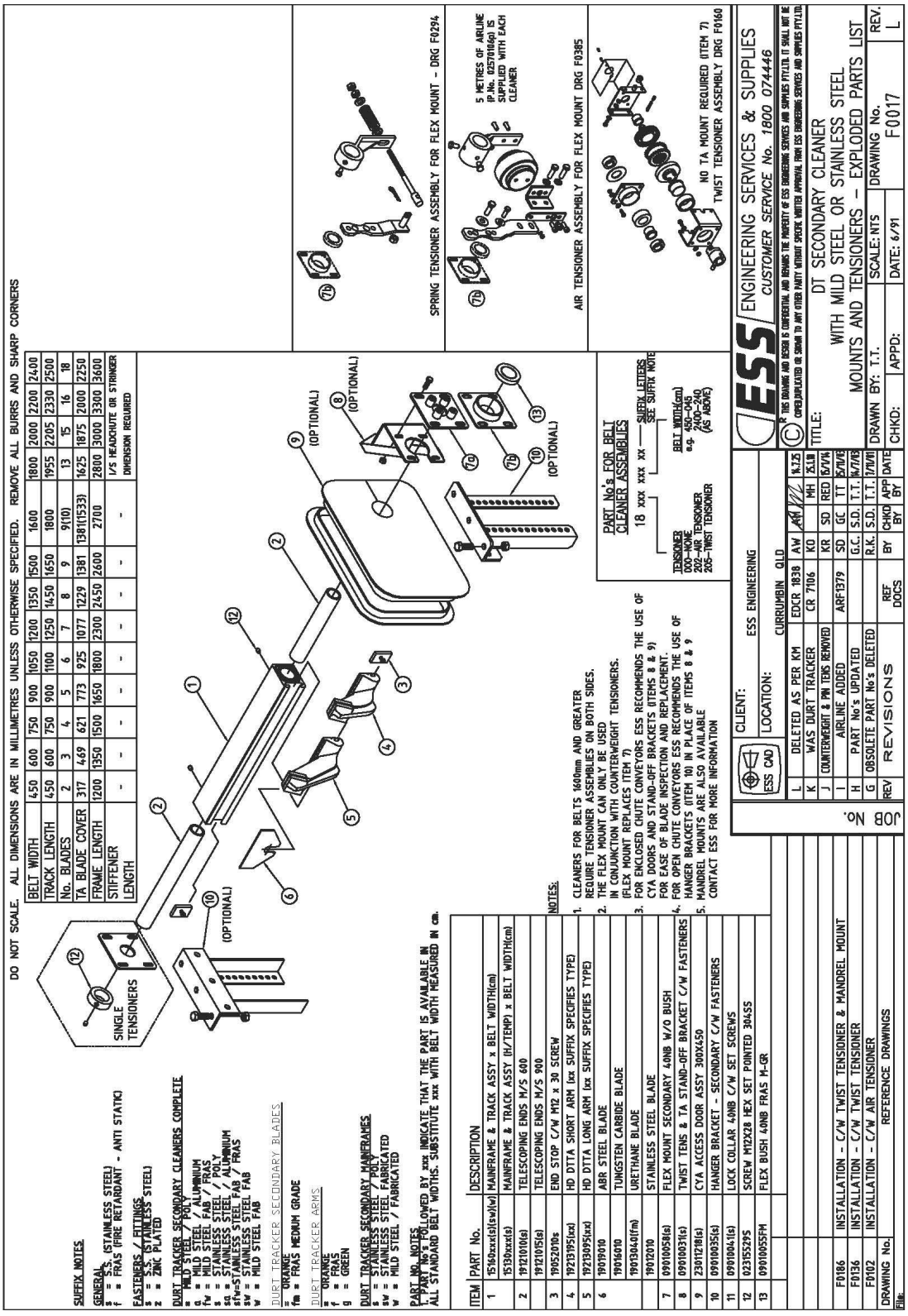
CAUSE	SOLUTION
Cleaner over-tensioned	Tension cleaner enough to clean the belt only. Refer to tensioner section 5.
Incorrect blade material	Contact *ESS* for re-appraisal

PROBLEM - Insufficient cleaning - too much carryback.

CAUSE	SOLUTION
Cleaner under-tensioned	Re-tension cleaner
Build-up on blade	Clean blades – refer to maintenance section. Add water spraybar.
Primary cleaner not functioning correctly	Service the primary cleaner
Blade vibration	See start of this section
Cleaner overloaded	Add additional cleaner

9.0 SPARE PARTS

F0017 - DT MOUNTS & TENSIONS



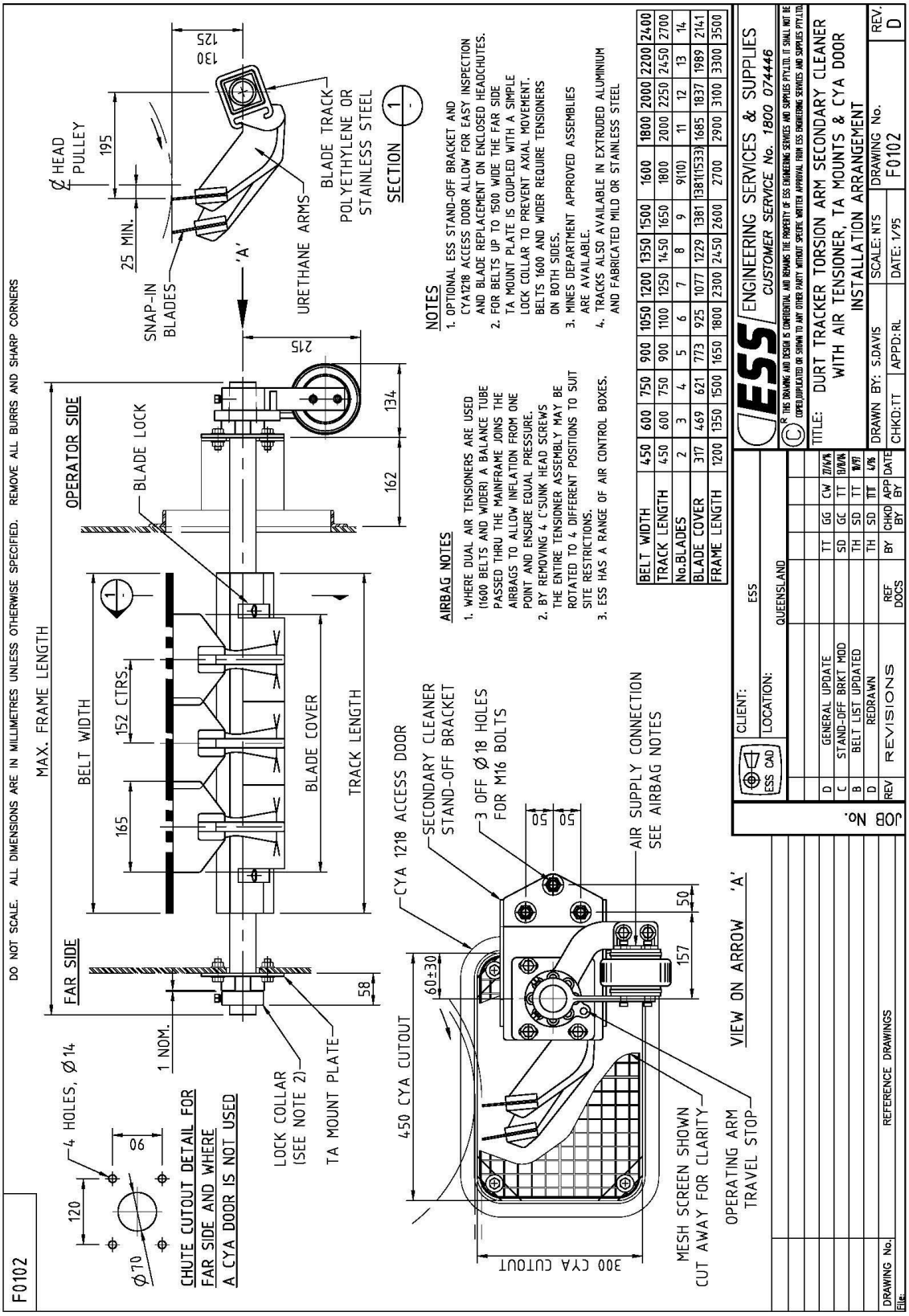
BELT WIDTH	450	600	750	900	1050	1200	1350	1500	1600	1800	2000	2200	2400
TRACK LENGTH	450	600	750	900	1100	1250	1450	1650	1800	1955	2205	2330	2500
No. BLADES	2	3	4	5	6	7	8	9	9(10)	13	15	16	18
TA BLADE COVER	317	469	621	773	925	1077	1229	1381	1381(1533)	1625	1875	2000	2250
FRAME LENGTH	1200	1350	1500	1650	1800	2300	2450	2600	2700	2800	3000	3300	3600
STIFFENER LENGTH	-	-	-	-	-	-	-	-	-	I/S HEADCHUTE OR STRINGER DIMENSION REQUIRED			

ITEM	PART No.	DESCRIPTION
1	15160xxxls(sw)(w)	MAINFRAME & TRACK ASSY x BELT WIDTH(cm)
	15130xxxls	MAINFRAME & TRACK ASSY (H/TEMP) x BELT WIDTH(cm)
2	19121010s	TELESCOPING ENDS M/S 600
	19121015s	TELESCOPING ENDS M/S 900
3	19052010s	END STOP C/W M12 x 30 SCREW
4	19213952xx	HD DTTA SHORT ARM (xx SUFFIX SPECIFIES TYPE)
5	19213095xx	HD DTTA LONG ARM (xx SUFFIX SPECIFIES TYPE)
6	19019010	ABR STEEL BLADE
	19016010	TUNGSTEN CARBIDE BLADE
	19013040(fm)	URETHANE BLADE
	19012010	STAINLESS STEEL BLADE
7	09010058(s)	FLEX MOUNT SECONDARY 40NB W/O BUSH
8	09010031(s)	TWIST TENS & TA STAND-OFF BRACKET C/W FASTENERS
9	23011218(s)	CYA ACCESS DOOR ASSY 300X450
10	09010035(s)	HANGER BRACKET - SECONDARY C/W FASTENERS
11	09010041(s)	LOCK COLLAR 40NB C/W SET SCREWS
12	02315529S	SCREW M12X28 HEX SET POINTED 304SS
13	09010055FM	FLEX BUSH 40NB FRAS M-GR
F0186		
F0136		
F0102		

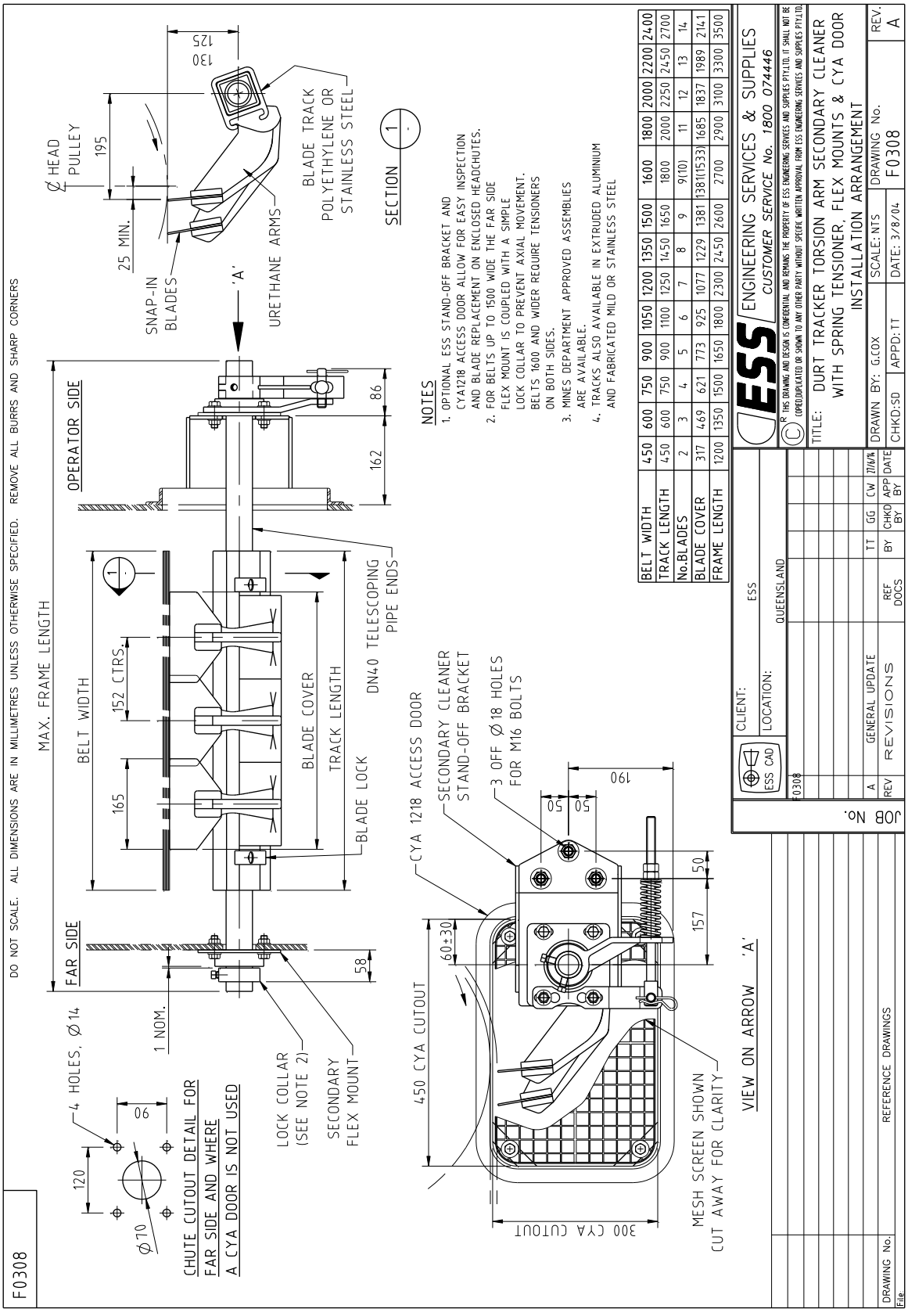
REV	BY	CHKD BY	REF DOCS	APP BY	DATE
L	KR	SD	RED	MH	6/7/94
K	KO		MH	JLB	25.1.8
J	KR	SD	RED	MH	15/7/94
I	SD	GC	TT	MH	15/7/94
H	G.C.	S.D.	T.T.	MH	14/7/95
G	R.K.	S.D.	T.T.	MH	17/11/95

10.0 INSTALLATION DRAWINGS

F0102 - DT WITH AIR TENSIONER, TA MOUNTS & CYA DOOR



F0308 - DT WITH SPRINT TENSIONER, FLEX MOUNTS & CYA DOOR



11.0 FINAL CHECKLIST

Site:_____ Number: _____ Date:_____

Site Equipment No./Location: _____ Site Contact: _____

Completed By: _____

(Circle Yes or No Below)

Was equipment to ESS Specification? Yes/No

Drawing No. Ref:_____ Attached? Yes/No

If No, WHY _____

_____

Will this affect performance? Yes/No

If Yes, WHY _____

_____

Was this a standard ☐ service ☐ inspection ☐ installation? Yes/No

If No, WHY _____

_____

Was work carried out as per procedure and JSA? Yes/No

If No, WHY _____

_____

Is equipment fit for commissioning? Yes/No

If No, WHY_____

_____

Was a final inspection carried out while plant was running? Yes/No

If No, WHY_____

_____

Has anything changed from previous service / inspection / installation? Yes/No

If Yes, WHAT _____

_____

Is equipment performance to Client expectations? Yes/No

If No, WHY _____

_____

ESS Signature: _____ Client Signature: _____

12.0 NOTES