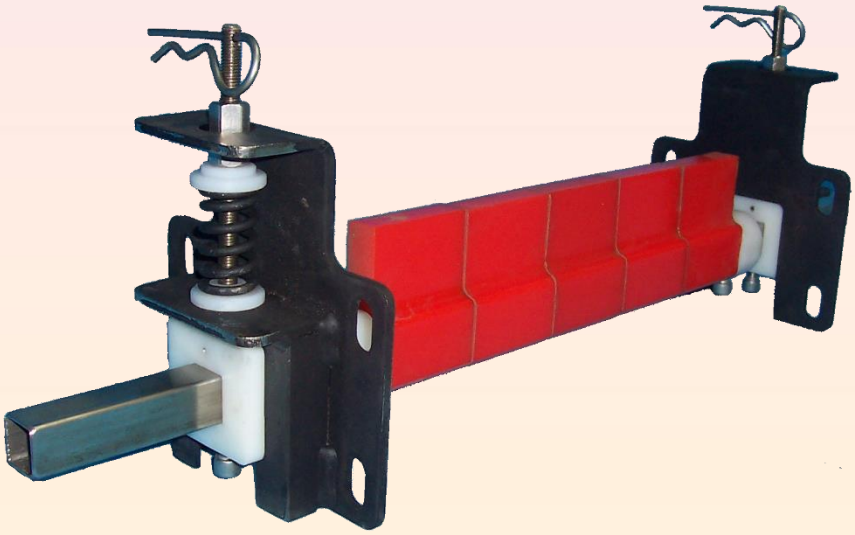
ENGINEERING SERVICES & SUPPLIES PTY LTD
Ph: 1800 074 446 www.esseng.com.au

# Compact Secondary Cleaner

## Installation, Operation & Maintenance Manual



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## WARRANTY

*ESS* WARRANTS the Compact Secondary 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:

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

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;

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:

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

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.

Refer to the Final Checklist at the back of this manual.

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

# CONTENTS

# FIGURES

# 1.0 SAFETY

The Compact Secondary Cleaner is designed to be quickly and easily serviced by appropriate personnel.

Under no circumstances should servicing or installation of the cleaner be carried out whilst the belt is in operation.

The conveyor must be shut down and locked out before any person enters or reaches into the conveyor enclosure.

Ensure that only suitably qualified and trained personel install and service this product. Ensure that all site and statutory safety procedures are followed.

Ensure that the installation, equipment, access ports and guards comply with the requirement of AS1755-2000 Conveyors – Safety Requirements.

## 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 *ESS* Compact Secondary Cleaner is a conveyor belt secondary cleaner, and is usually used in conjunction with a head pulley primary cleaner such as the ESS Compact Primary Cleaner.

It is normally mounted such that the cleaning blades contact the belt as it leaves the head pulley, or other accessible position on the return belt. The blades of the *ESS* Compact Secondary Cleaner, when tensioned, lay in the direction of belt travel, giving a negative angle and presenting no snag or danger to the belt or splices. (See Figure 1 - Secondary Cleaner)

The cleaner is tensioned against the belt using a linear spring tensioner. The tensioner / mount assembly can be arranged so the the adjuster is either at the top or the bottom of the mount. See drawings at the back of this manual.

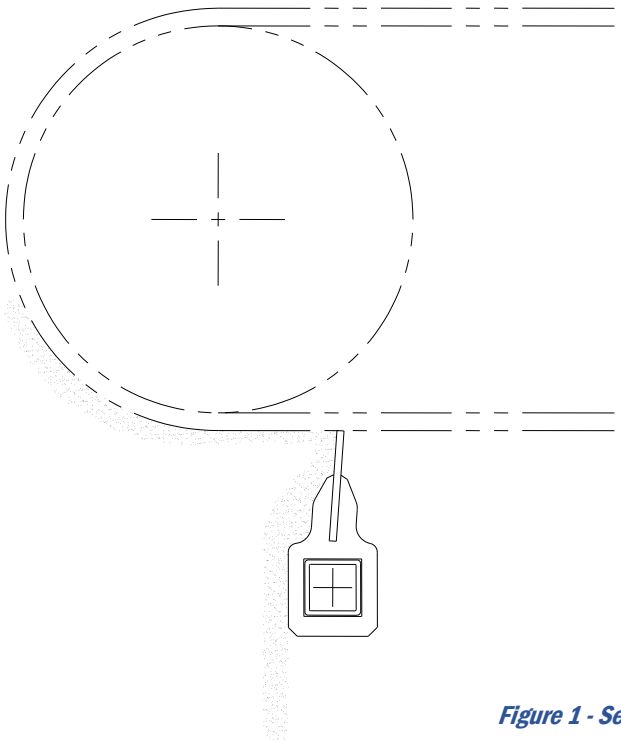


*Figure 1 - Secondary Cleaner*

The cleaner can be supplied or retrofitted with a variety of cleaning blades. These include:

ABR Tool Steel blades – For general purpose and abrasive materials.

Stainless Steel Blades – For very corrosive materials.

Urethane Blades – For damaged belts.

## 3.0 PREPARATION FOR INSTALLATION

1. CHECK INSTALLATION DRAWINGS - Ensure that you have the correct drawings 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
- allow you to plan the installation, reducing installation time.

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

4. OBSERVE THE CONVEYOR WHILE RUNNING AND CONVEYING MATERIAL -

    - 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

DANGER! Conveyor must be shut down and locked out before installation is performed.

WARNING! If installation is to be done in an enclosed area, test atmosphere for gas level or dust content. Follow all welding and safety guidelines.

Protect belt surface from weld spatter with appropriate shield.

**Note 1** For original equipment installation, where cleaner cutouts and brackets have been fabricated into the chute during construction, ignore steps 1,2 and 3.

**Note 2** Solid backing of the blades is essential to ensure proper operation and efficient cleaning. Install the cleaner adjacent to the head pulley or a flat pressure roller to obtain best cleaning results – see Figure 2 - Locating Cleaner Centreline.

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.

**Step 1** Locating Cleaner Centreline

On the return side of the belt locate the tangent point at which the belt leaves the head pulley. Measure a distance 50 mm and scribe a line perpendicular to the belt at this point. See Figure 2 - Locating Cleaner Centreline

Note: For installation below pressure rollers mark the vertical line 50 mm from the centreline of the roller. See Figure 3 - Locating Cleaner Centreline.

This line represents the centre line of the In-Line Cleaner and the cleaner mount brackets.

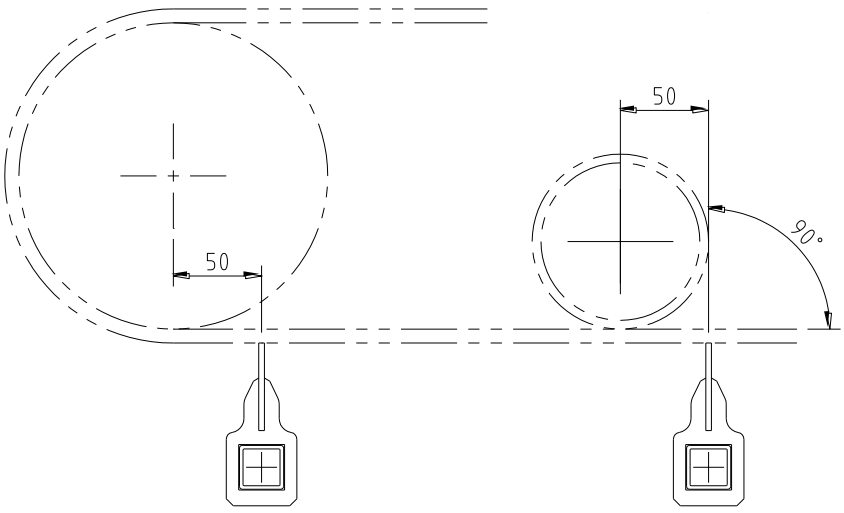



*Figure 2 - Locating Cleaner Centreline*

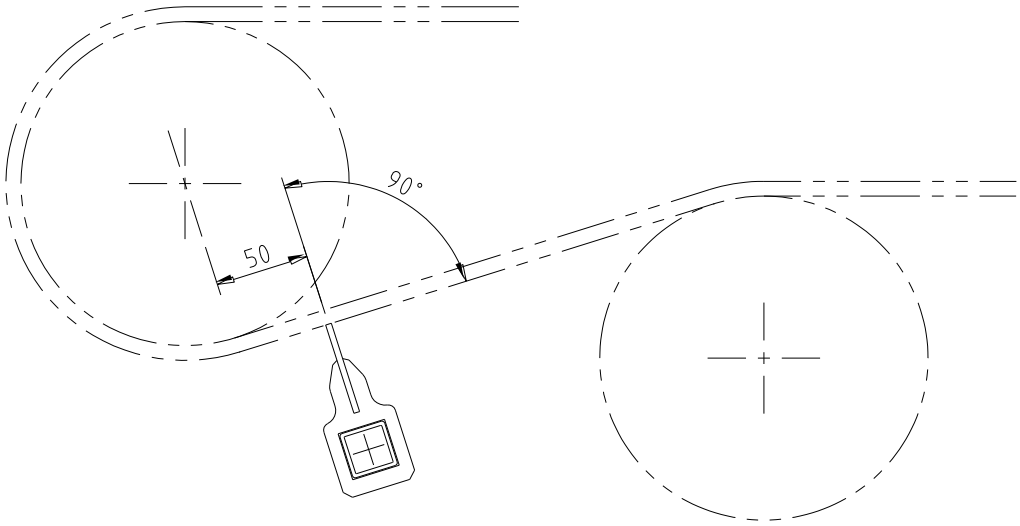



*Figure 3 - Locating Cleaner Centreline*

## **Step 2** Mark-Out Chute Cutouts

Decide on the mount / tensioner configuration required (spring at top or bottom). Take the mount assembly as supplied and hold it against the chute in the installation position. Is there room for operation of the tensioner, and access for maintenance? If not, try reassembling the mount to the alternate configuration – see drawings at back of manual.

Using the previously marked line as the centre line, mark the chute cutout and mount hole locations as shown in Figure 3 - Locating Cleaner Centreline above. Repeat on both sides of chute, ensuring that the cutouts are accurately aligned with each other.

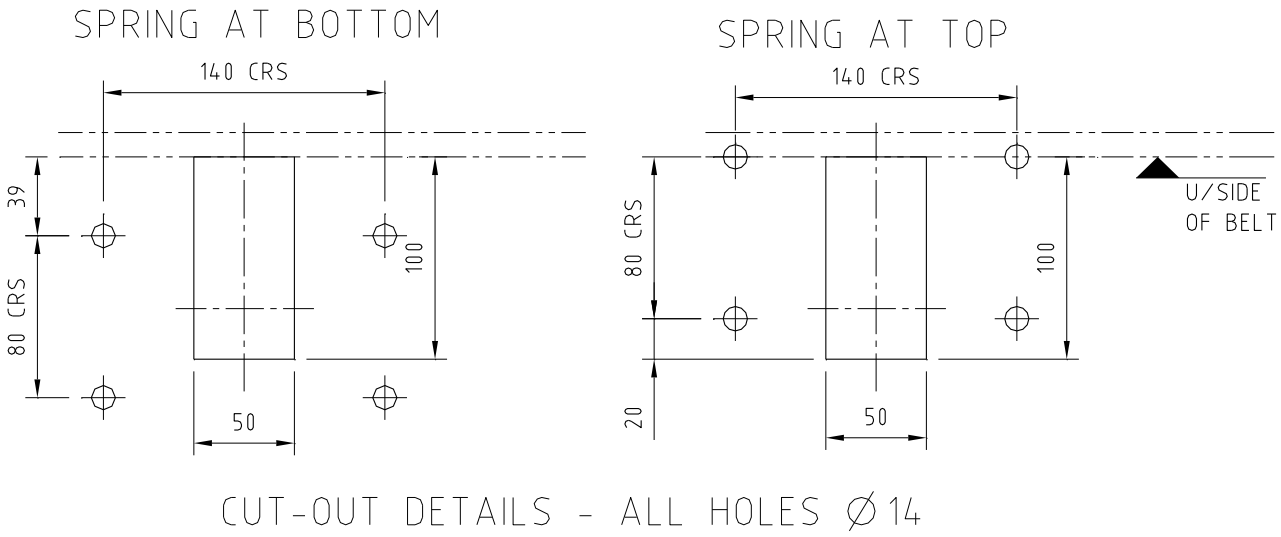



*Figure 4 - Cut Out Details*

### Verify Cleaner Position Before Proceeding

If not already done, disassemble the cleaner mount / tensioner assemblies from the cleaner mainframe. To do this, simply loosen the retaining screw in the underside of each mount, and slide the mount assemblies from each end of the mainframe. It should not be necessary to remove the blades and blade locks from the mainframe.

Position the mount / tensioner assembly over the marked hole centres. Verify that the mounts fit, and that adequate room is available to tension the cleaner.

Once mounting position is confirmed, proceed.

**Step 3** At the selected mounting positions, cut the cleaner access slots, and drill the mount holes in each side of the chute. Dress and de-burr the holes and cutouts.

**Step 4** Fit the Far Side mount bracket to the chute wall. Bolt the mount to the chute wall using 4 x M12 bolts.

Step 5 Fit the cleaner Mainframe and blade assembly through the operator side chute cutout and insert the far end into the Far Side mount assembly. (if the blades catch on the belt, the tensioner may need to be relaxed – refer to the operation of the Spring Tensioner in section ?)

Fit the Operator Side mount assembly over the loose end of the Mainframe, and bolt into place using 4 x M12 bolts through the pre-drilled holes.

Centre the mainframe, and more importantly the blades, to the belt position, then tighten the mainframe retaining screws in the mounts.

Note: The mainframe in most cases will have excess length. If required, this excess can be trimmed off. Ensure that approximately 20mm of mainframe protrudes from each end.

**Step 6** With the cleaner tensioner in the fully retracted position, the cleaning blades should be approximately 5-8mm clear of the underside of the belt, and this distance should be equal across the width of the belt.

If necessary loosen and adjust the mounts / tensioners up or down to achieve this clearance. Once all clearances are correct, thoroughly check all mounting and locking screws to ensure they are tight, and the cleaner is secured.

Installation is now complete, and the cleaner is ready to be adjusted against the belt

# 5.0 OPERATION OF THE SPRING TENSIONER

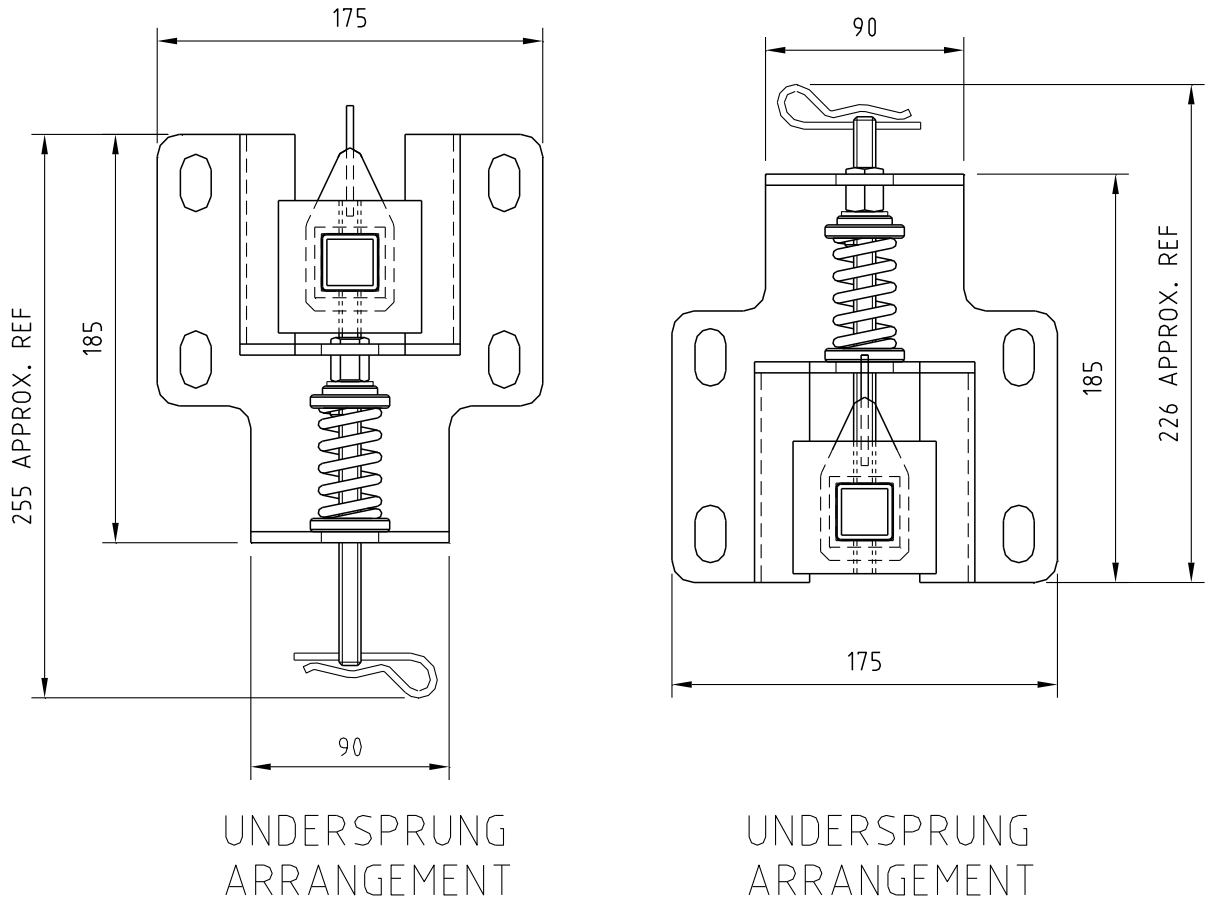



*Figure 5 - Spring Tensioner*

## 5.1 DESCRIPTION

The Spring Tensioner consists basically of a central threaded adjuster rod and a compression spring. An adjusting nut on the rod above the spring is used to adjust the cleaner mainframe and blade assembly against the belt to the required force. The spring allows storage of force to take up blade wear, and to absorb belt irregularities or loading from belt reversal.

The amount of force required to be applied is dependent on the belt width, and is gauged by the compressed length of the spring. The reduction in spring length multiplied by the spring rate will equal the force applied. Because the spring rate and free length are known, the easiest measure is of the spring height after adjustment.

# 6.0 ADJUSTMENT PROCEDURE

Loosen the locking nut above the spring. Repeat for both sides.
Turn the adjusting nut (equally on both sides) until the cleaner blades are just touching the belt.
Ensure that the blade position is equal across the belt – that is, the blades are just touching across the belt width.
Continue turning the adjusting nut equally on both sides until the spring compressed length is the same as indicated in the table below.

Start the conveyor and observe the cleaning action of the blades. Ensure that the blades ride smoothly on the belt with no vibration.
Tighten the lock-nuts against the adjusting nuts.

Recommended Spring Tension

| Belt Width | Compressed Spring Length |
|---|---|
| <300 | 49-50 |
| 300-450 | 48 |
| 450-600 | 46 |
| 600> | 44 |

***Table 1 – Recommended Spring Tensions***

## 6.1 MAINTENANCE PROCEDURE

To access the blade assembly for maintenance, first de-adjust the cleaner by reversing the above procedure. Loosen the lock-nuts, and run them right up to the top of the adjusting rod.

Repeat with the adjusting nuts, but alternate sides every 2 turns (or use an assistant) to ensure that the cleaner is backed off the belt evenly. Again, fully run the adjusting nuts right up to the top of the rod. This will ensure that the cleaner is fully retracted, and there will be room to slide the blade cartridge with new blades back into position.

## 6.2 WHERE ACCESS TO CHUTE IS UNRESTRICTED

When it is possible to easily reach into the chute, the blades are simply removed and replaced without disturbing the cleaner mounts.

Loosen the mainframe retaining screws on each side mount. Loosen the lockscrew on the blade lock each side of the blades.

Carefully withdraw the mainframe, allowing first the far side blade lock, then the blades to slide off the mainframe. Ensure that the blades cannot drop into an inaccessible position.

To replace the blades, reverse this procedure. Fit a blade lock, followed by the appropriate number of blades, then the far side blade lock, whilst carefully inserting the mainframe.

Centre the blades and mainframe to the belt, then tighten the blade locks and the mainframe retaining screws.

# 7.0 WHERE ACCESS TO THE CHUTE IS RESTRICTED

Where it is not possible to reach into the chute enclosure, the cleaner mainframe can be removed complete.

- Loosen the mainframe retaining screw on the operator side mount.
- Unbolt and remove the operator side mount assembly.
- Loosen the mainframe retaining screw on the far side mount.
- Working from the operator side, withdraw the mainframe and blade assembly from the far side mount and remove it from the chute.
- Service the blades in a convenient workplace.
- Re-assembly is the reverse of the above procedure. Re-adjust the cleaner as described in Section 5.2 **Adjustment Procedure**.

# 8.0 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, load conveyed material on to the belt. 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 on 1800 074 446*.

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

# 9.0 ROUTINE MAINTENANCE AND SERVICE

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.

CAUTION! DO NOT REACH INSIDE THE CONVEYOR CHUTE UNDER ANY CIRCUMSTANCES WHILST THE CONVEYOR IS RUNNING.

**Routine Inspection/Tension:**

**Step 1** Inspect the condition of the cleaner. Open the inspection panel (if fitted) and observe the condition and action of the blades and cleaner.

**Step 2** If necessary (and if plant rules allow it), hose any material build-up from the blades or mainframe –

Do Not Reach Into The Chute Whilst Conveyor Is Running

**Step 3** If necessary, adjust the cleaner tension - refer to appropriate section for tensioner used.

## If Blade Servicing Is Required

**Step 1** Shut down and lock out the conveyor as per site safety procedures.

**Step 2** De-adjust the cleaner as described in Section 5.

**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 blades or the complete cleaner mainframe as described in section 5.3.

**Step 4** Clean and inspect the blades - if blades are excessively worn replace with new blades. If existing blades are to be re-used, ensure that they are installed in the same order / position as they were removed.

**Step 5** Re-install blades and mainframe into cleaner mounts. Re-tension the cleaner as described in Section 5.2.

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

## 10.0 TROUBLESHOOTING

**PROBLEM** - Blades vibrate.

| CAUSE | SOLUTION |
|---|---|
| Incorrect installation angle | Check installation, ensuring cleaner mount is perpendicular to belt |
| Belt deflected upward on tensioning of cleaner | Install an idler roller over the belt near the belt contact point |
| Belt vibration being transferred to cleaner | Install an idler roller over the belt near the blade contact point |

**PROBLEM** - Mainframe bent.

| CAUSE | SOLUTION |
|---|---|
| Mainframe undersized | Stiffened mainframe required. Contact *ESS* for assistance |
| Excessive tension | Relax blade tension to maximum tension recommended in installation instructions |
| Material build-up between blades/ mainframe and belt | Increase frequency of inspection and service once a week |
| Normal deflection | A small amount of deflection is considered normal. Contact *ESS* if excessive deflection occurs |

**PROBLEM** - Higher blade wear rate than estimated.

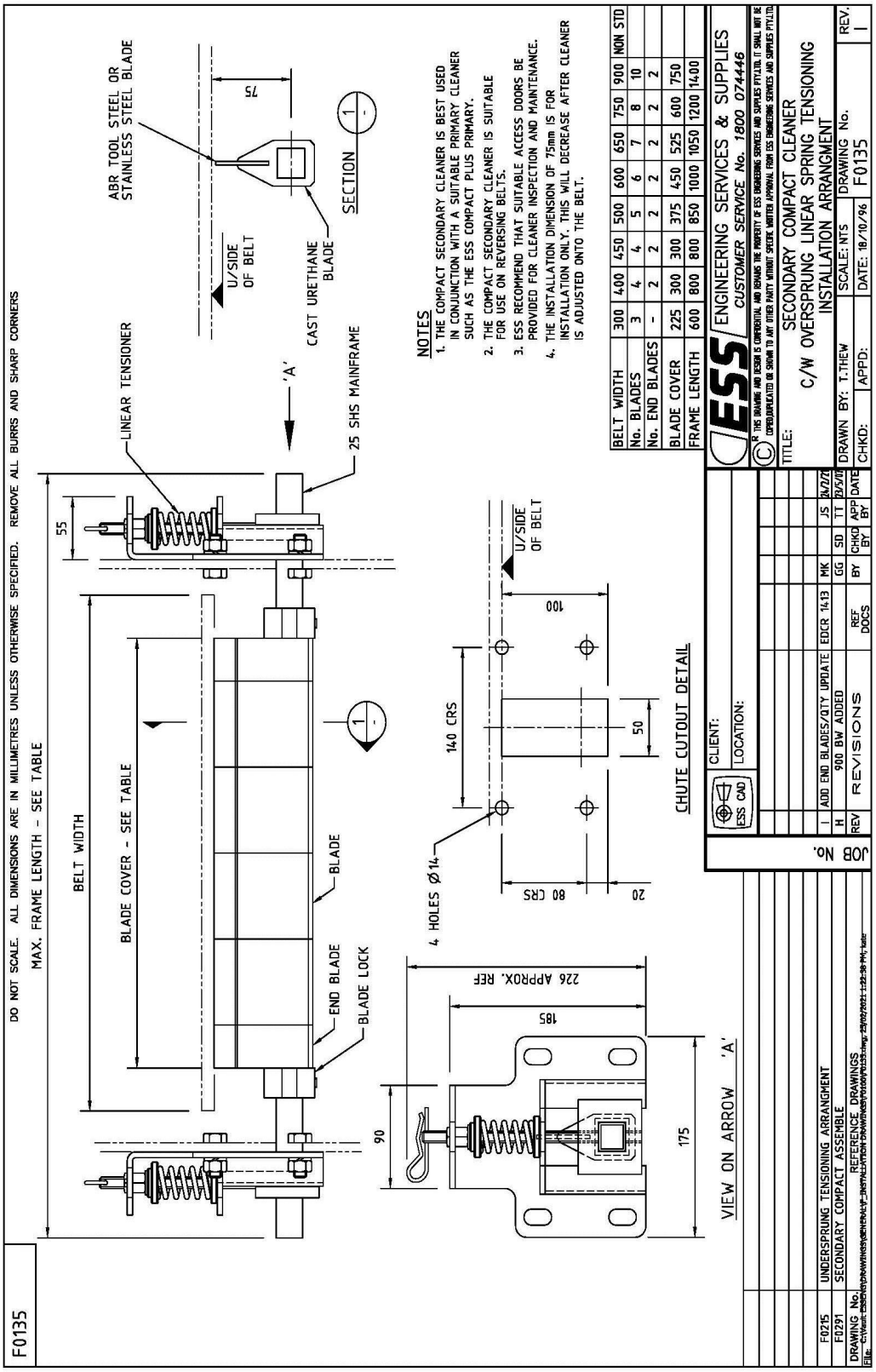
| CAUSE | SOLUTION |
|---|---|
| Cleaner over-tensioned | Tension cleaner enough to clean the belt only |
| Incorrect blade material | Contact *ESS* for re-appraisal |

**PROBLEM** - Insufficient cleaning - too much carryback.

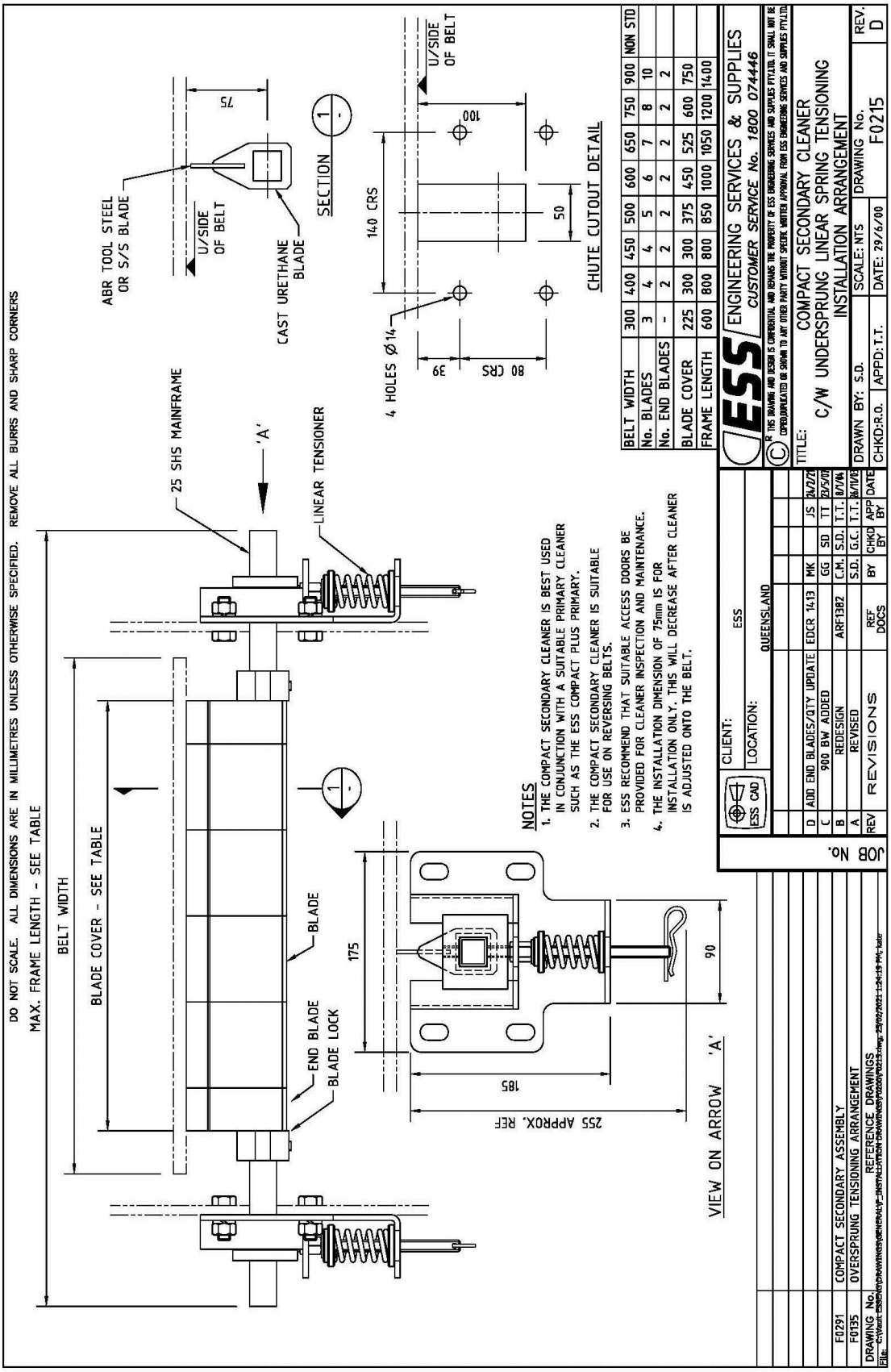
| CAUSE | SOLUTION |
|---|---|
| Cleaner under-tensioned | Re-tension cleaner |
| Build-up on blade | Remove blades and clean. Increase service frequency |
| Primary Cleaner not functioning correctly | Service the Primary Cleaner |
| Blade vibration | See start of this section |
| Cleaner overloaded | Add additional cleaner |

# 11.0 INSTALLATION ARRANGEMENT DRAWINGS

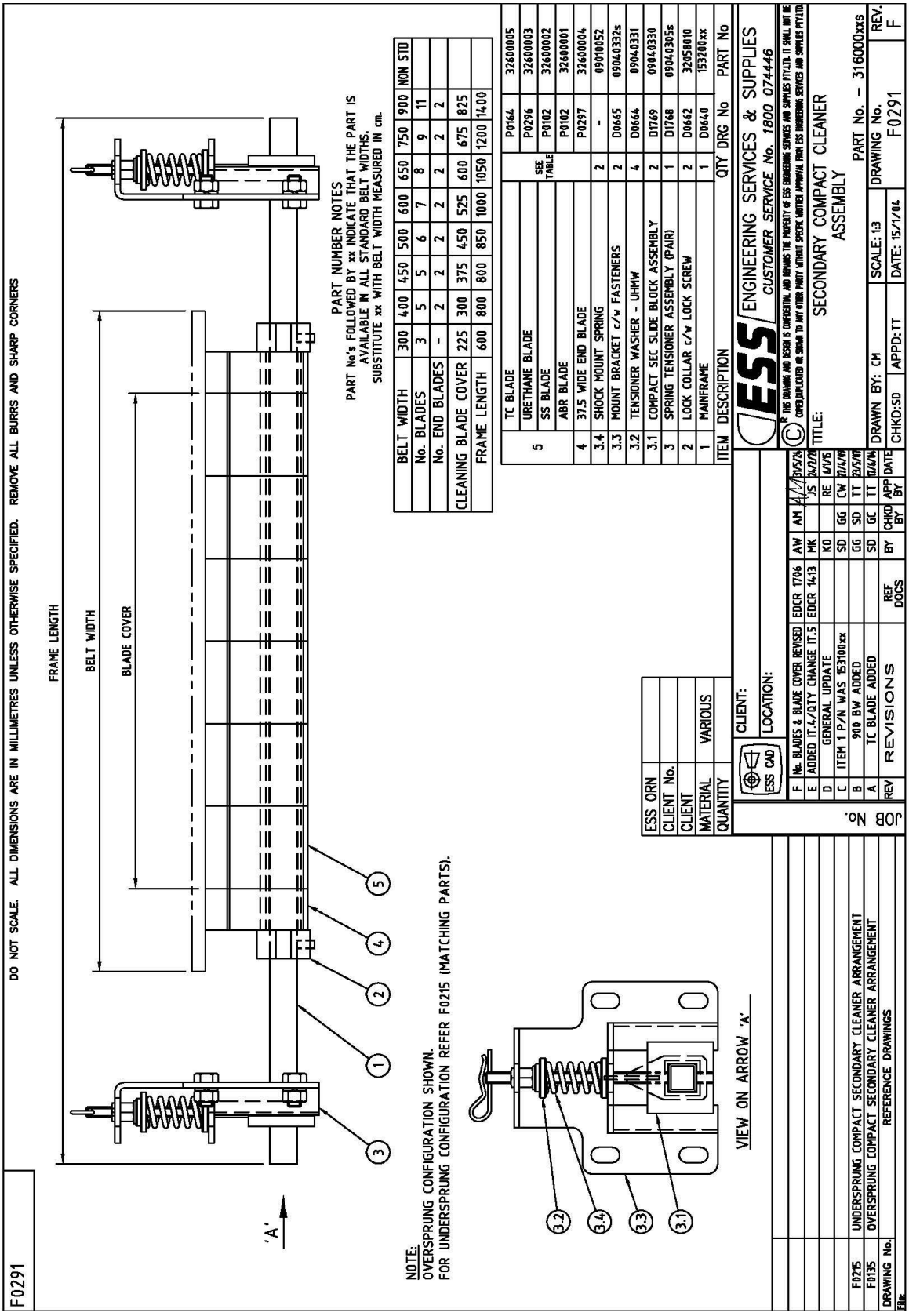
## F0135 – C/W OVERSPRUNG LINEAR SPRING TENSIONING



# F0215 – C/W UNDERSPRUNG LINEAR SPRING TENSIONING



# F0291 – SECONDARY COMPACT CLEANER ASSEMBLY



## 12.0 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: _____

## 13.0 NOTES