

Heavy Duty Return Belt Cleaner (HDRBC)



MARTIN
ENGINEERING

Installation Operations Manual

Revision	Description of Change	Changed By	Date
A	Added Final Checklist	AS	28/5/07
B	Updated Melbourne Address & Removed SA Address	SH	3/08/09
C	Final Checklist Updated Items 4 & 5 Reversed	SH	15/04/10
D	Updated manual as per CR2634	SH	12/08/10
E	Revised drawing F0147 - Rev G & F0141 Rev F	KO	14/03/11
F	Revised dwg F0147 H	KO	17/04/12
G	Revised dwg F0147 Rev I	KO	04/06/12
H	Revised dwg F0147 rev J, removed Mt Isa contact details	KO	21/06/12
I	Revised dwg F0147 Rev K	KO	23/8/12
J	Updated format of manual	KO	20/2/13
K	Added paragraph to page 6	KO	30/10/13
L	Updated F0147	KO	6/2/14
M	Updated office details	KO	11/3/14

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**TOLL FREE 1800 074 446 FROM ANYWHERE IN AUSTRALIA
VSS TOLL FREE 1800 300 877**

WARRANTY NOTE

ESS WARRANTS the **Heavy Duty Return Belt Cleaner (HDRBC)** 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.

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

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

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Information contained herein is for use in the operation of the **Heavy Duty Return Belt Cleaner (HDRBC)**, purchased from **ESS** and cannot be passed on to any other party without express permission, in writing, from **ESS**.

INDEX

SECTION 1

SAFETY

SECTION 2

INTRODUCTION

SECTION 3

PREPARATION FOR INSTALLATION

SECTION 4

INSTALLATION

SECTION 5

COMMISSIONING

SECTION 6

OPERATOR TRAINING

SECTION 7

ROUTINE MAINTENANCE AND SERVICE

SECTION 8

INSTALLATION ARRANGEMENT DRAWING

SECTION 9

EXPLODED PARTS DRAWING

SECTION 10

FINAL CHECKLIST

SECTION 1 - SAFETY

The HEAVY DUTY RETURN BELT 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 personnel install and service this product. Ensure that all site and statutory safety procedures are followed.

SECTION 2 - INTRODUCTION

The **ESS** HEAVY DUTY RETURN BELT CLEANER (HDRBC) is a return belt cleaner designed to remove fugitive material from the inner side of the return strand of a conveyor belt. The HDRBC is normally located before the tail pulley, gravity take up, mid-drive unit or any other position where fugitive material can become trapped between the belt and pulley, causing damage or wear to the belt, pulley or pulley lagging.

The **ESS** HDRBC features a urethane blade for long-life and efficient cleaning, and can also be supplied in Mines Department approved FRAS urethane for underground coal and similar applications.

The main feature, however, of the **ESS** HDRBC, is the unique urethane torsion strap suspension. This suspension arrangement allows pre-tensioning of the HDRBC onto the belt by simply rotating the support pipes.

The HDRBC is held lightly against the belt surface, and “floats” with the belt movement, eliminating the “chatter” commonly associated with gravity-type Vee Ploughs.

NOTE: The *ESS* HDRBC is directional, and is not suitable for reversing belts.

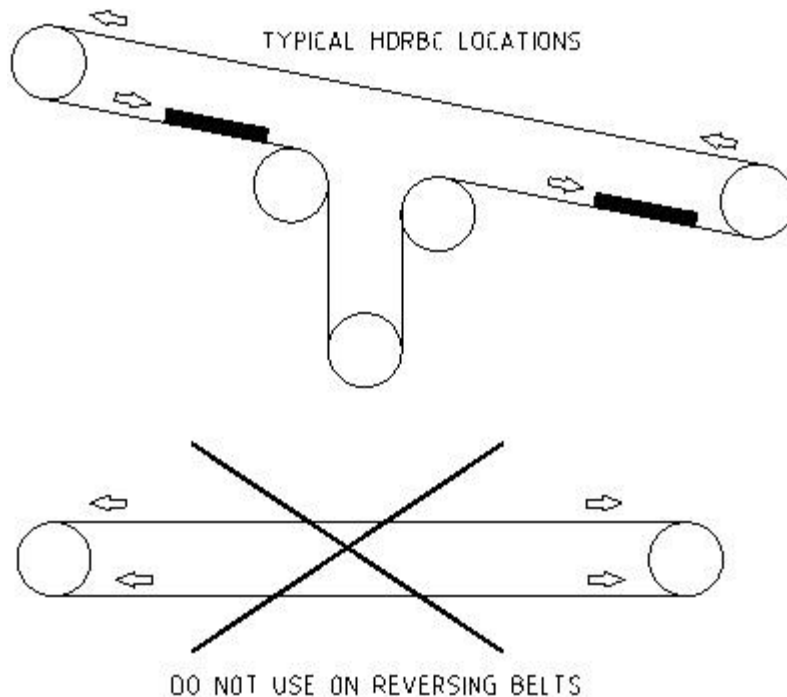


Figure 1: Typical installation positions and use of HD-RBC

Location of the Return Belt Cleaner should be carefully considered so that the material removed from the belt does not create a hazard as it falls or where it accumulates. Also the consideration should be given to having the ability to observe the cleaner during operation. The cleaner should be installed so that it is positioned between return rollers and not on top of a return roller.

SECTION 3 - PREPARATION FOR INSTALLATION

1. ASCERTAIN INSTALLATION POSITION

As previously noted, the **ESS** HDRBC is intended to be installed on the inside return conveyor belt, just before the tail pulley, gravity take-up or similar.

The position selected for installation should have a flat, taut belt (see notes in Section 4), and good access for installation and maintenance. Suitable support structure for attachment of the HDRBC mounts is also required.

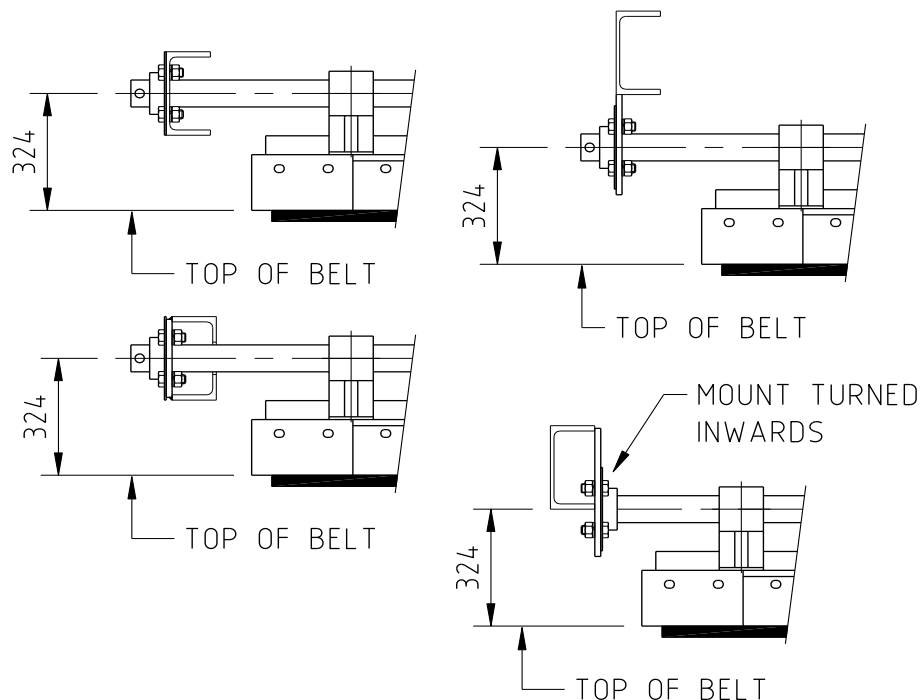
2. OBSERVE BELT CONDITIONS

- Does the belt reverse or roll back on stopping? If so, do not use this HDRBC. An **ESS** Diagonal Plough is used on reversing belts.
- Is the belt flat and taut or does it sag or cup
- Does the belt bounce or vibrate?
- The HDRBC will operate best on a flat, vibration free belt. Achieve these conditions by appropriate use of flat rollers – SEE NOTES IN SECTION 4.
- If a flat, stable belt cannot be achieved contact ESS before proceeding with the installation.

3. TRIAL ASSEMBLE HDRBC

Familiarise yourself with the parts and operation of the HDRBC. Plan the installation. Measure and pre-manufacture any mounting brackets that may be required.

Note! Dimensions shown here are for the HDRBC



TYPICAL MOUNT / STRINGER ARRANGEMENTS

Figure 2 : Typical Installation dimensions – HD-RBC.

4. ASSEMBLE THE NECESSARY TOOLS AND SAFETY EQUIPMENT REQUIRED FOR THE JOB.

SECTION 4 - INSTALLATION

4.1 NOTES:

BEFORE PROCEEDING WITH INSTALLATION, ENSURE THAT THE CONVEYOR BELT DRIVE IS FULLY ISOLATED AND LOCKED OUT.

DO NOT ALTER SPECIFIED HDRBC INSTALLATION DIMENSIONS TO AVOID SITE OBSTACLES – THE HDRBC WARRANTY WILL BE VOIDED IF NOT INSTALLED TO SPECIFIED DIMENSIONS.

4.2 DIMENSIONAL NOTES AND CHECKLIST

The following tolerances may be applied to installation dimensions quoted in this section:

- The dimension from top of belt to centre of support pipes is 324 ± 5 mm.
- The dimension between support pipes centres is $\text{DIM C} \pm 5$ mm.
- Tolerance on support pipe squareness to conveyor centreline (viewed in plan) is maximum 5 mm out of square for each 1000 mm of pipe length.
- Tolerance on support pipe parallelism is maximum 5 mm out of parallel for each 1000 mm of pipe length.
- The centre line of plough should align with the centre line of the conveyor. The maximum deviation is 5 mm either side of centre, measured at the nose and at the tail of the HDRBC frame.

4.3 NOTES ON BELT SUPPORT

The HDRBC must be installed on a flat belt to achieve best results, and to avoid damage to the unit caused by misalignment of supports. The following procedure may be used to achieve a flat belt:

ESS recommends that a return roller should be installed within 150 mm of the front edge of the cleaner nose (before or after). A second roller after the HDRBC will only be required if the following factors are present:

- Low belt tension
- Visible or measurable belt deflection under the weight of the HDRBC
- Belt edge cupping or curling
- Belt vibrations that are transferred into the HDRBC

Where a belt is in a high tension condition, and the unit is installed close to a tail or bend pulley, a second support roller is unlikely to be required unless excessive vibration is detected.

When installing support rollers under a belt in the area of a HDRBC, care must be taken not to alter the line of the conveyor belt. This may result in the distance from the top of belt to the support pipes being altered. If the line of the belt is altered, the HDRBC installation dimensions should be re-checked and adjusted if necessary.

4.4 Installation Procedure

- Step 1** Place the HDRBC without support pipes or tensioning straps on the belt at the selected position. Ensure that the HDRBC frame rear cross member is 90° to the centre line of the belt (see fig 3).
- Step 2** Measure 124mm forward from the nose of the HDRBC, and 324mm perpendicular upwards from the belt surface (see fig 1). Mark this point on the stringer or conveyor structure on each side of the belt, ensuring that the line between the points is at 90° (square) to the belt. These points represent the centre lines of the front support pipe and front mount sets.
- Step 3** Install the front support pipe and mounts at the above point. Installation may involve cutting holes or attaching brackets to conveyor structure (see typical mount arrangements in previous section, and cut out details below). Seek site Engineer's approval before modifying conveyor structure.

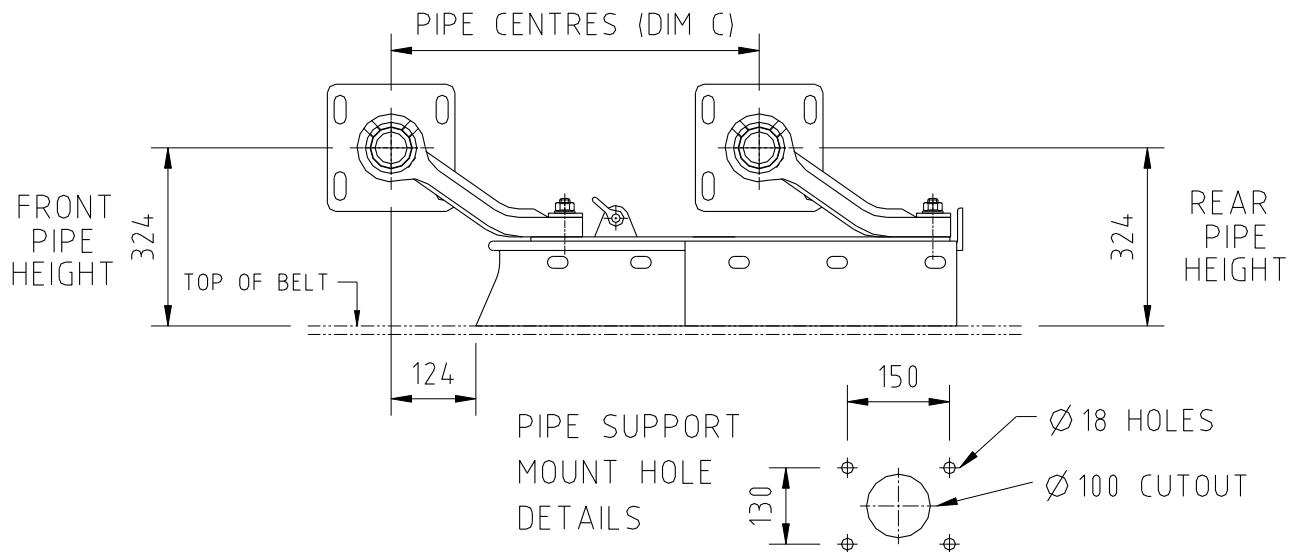


Figure 3 – Relationship to Belt Position

- Step 4** Measure back from the above point a distance equal to dimension "C" from above table 1, and parallel to the belt (i.e. 324mm from belt surface). This point represents the centre line of the rear support pipe and mounts.

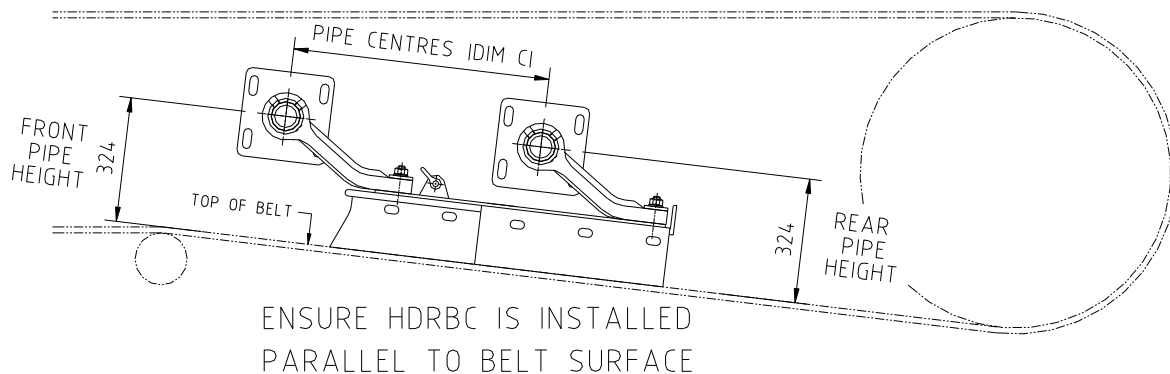


Figure 4 – Installation Dimensions

Table 1 – Dimension C

Belt Width	900	1050	1200	1350	1500	1600	1800	2000	2200	2400	2500
Pipe Centres (Dim C)	277	352	427	502	577	627	727	827	927	1027	1077

Step 5 Install rear support pipe and mounts, as previously described.

STOP: At this point, check that the two support pipes are exactly 324mm from centre of pipe to top of belt. Check that the two pipes are exactly Dim C apart from centre to centre. Check that the two pipes are square to the belt and parallel to each other.

Step 6 If not already done, withdraw the pipes through one mount and slide on the urethane tensioning straps – one on the front pipe and two on the rear. Centralise the HDRBC and pipe supports to the belt and/or stringers, and align the straps to the holes in the HDRBC frame. The holes should easily align without force. Insert bolts and bolt the strap ends to the HDRBC frame.

If the strap holes do not align with the frame holes, DO NOT bend or distort the strap to align them. Re-check pipe installation dimensions to correct the misalignment. Distorting the straps may result in vibration and failure of the HDRBC and the straps.

If after re-checking, the hole in the straps do not match the holes in the frame immediately contact ESS.

Step 7 Attach one end of the safety chain by shackle to the HDRBC frame. Loop the other end around the front support pipe and connect to itself with the other shackle, allowing approximately 70-80mm of slack for blade wear.

Tighten the lockscrews securing the tensioning straps to the support pipes.

Step 8 At one end of each support pipe drill a hole large enough for insertion of an appropriate tensioning bar (say Ø25 hole). Refer to drawing F0141 in this manual. As an alternative, a pipe wrench may be used for tensioning.

Step 9 If support pipes are over long, trim off the appropriate amount, remembering to leave enough pipe exposed for tensioning (see Step.8 above).

Step 10 From outside the conveyor enclosure; rotate the front support pipe to just place a slight downward load on the front tensioning strap, but without inducing any visible deflection in the strap. Tighten the lock(screw) on the support pipe mounts to retain the adjustment, and to prevent movement of the pipe. Repeat for the rear pipe and straps.

Installation of the HDRBC is now complete. The conveyor can be returned to service and commissioning of the HDRBC can commence.

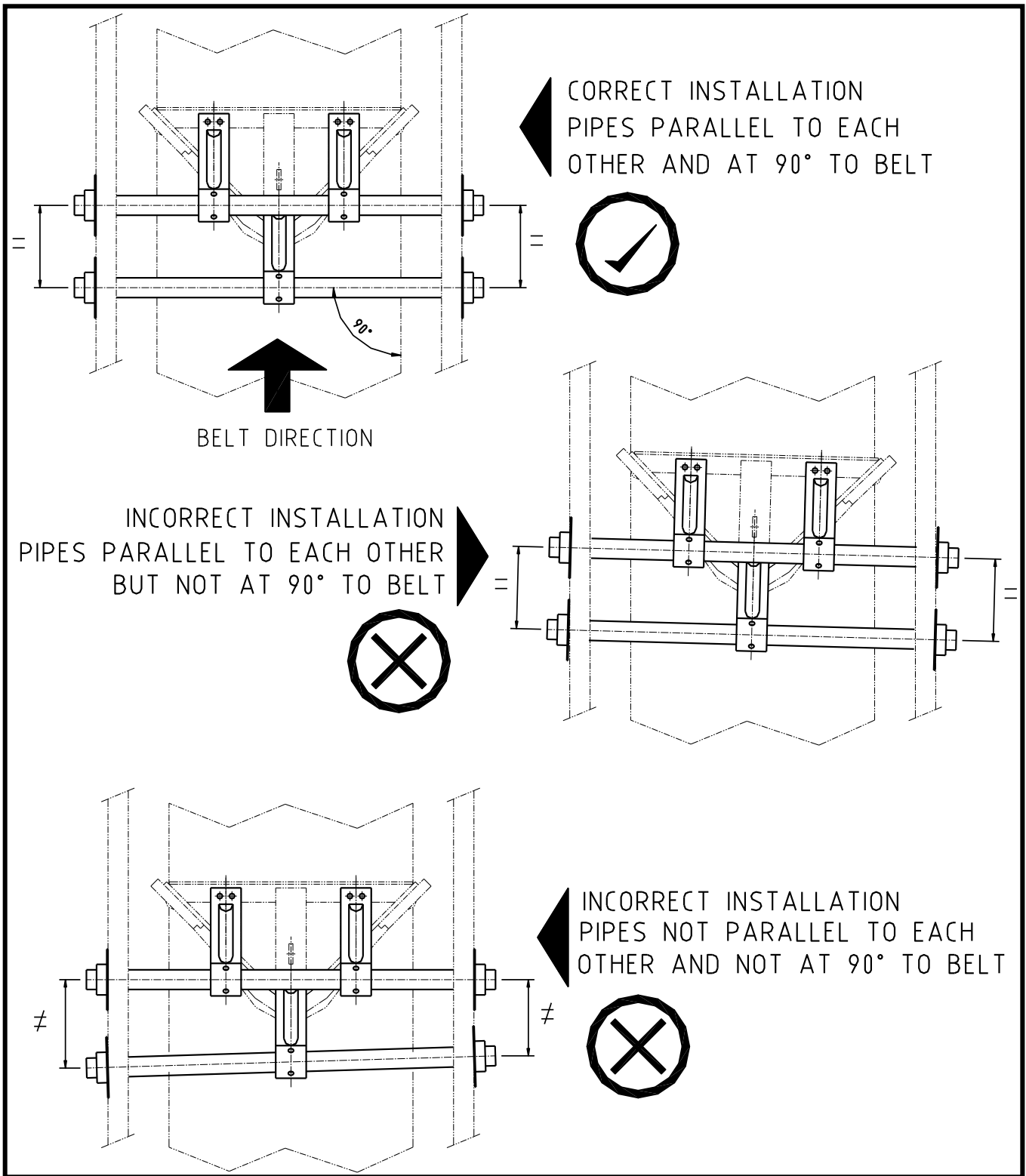


Figure 5

SECTION 5 - COMMISSIONING

Step 1 Start the belt - Observe the action of the HDRBC.

The HDRBC should ride smoothly on the belt with no chatter or vibration. If vibration is present, repeat the tensioning procedure in Step 10 of Section 4, but slightly increase the contact pressure. Do not over-tension the HDRBC - it will not increase cleaner efficiency but will increase blade wear.

If vibration is present after moderate tensioning, contact **ESS** on **1800 074446** within Australia, or +61 7 5589 2000 from outside Australia, for further advice.

Step 2. Demonstrate the system to the operating supervisors and crew

Call the supervisors responsible for maintenance and operation to the site. Make a short run of the system. Show the operator how to adjust and operate the system.

Step 3. Secure the system for production

Follow plant procedure to secure the conveyor for actual production.

SECTION 6 - OPERATOR TRAINING

The decision to purchase **ESS** Belt Cleaning equipment is the first step toward achieving a clean plant. The next step is the correct installation of the equipment as outlined in this manual. The final step is to maintain and service the equipment to guarantee ongoing performance.

ESS strongly recommends that operators are correctly trained to maintain **ESS** equipment, or that **ESS** is commissioned to maintain the equipment on a scheduled basis.

The benefits of efficient cleaners outweigh the cost of maintaining the cleaners many times.

1. Adhere to all local safety rules.
2. Give a "Hands On" instruction with the conveyor system shut down.
3. Give a "Hands On" instruction with the conveyor system running.
4. All service must be recorded and given to a person of responsibility.
5. Encourage the person being trained to look for possible problems developing on the system, eg. excessive or unusual vibrations, belt tracking excessively, tears or damage to belt, seized idlers, missing bolts, etc.

A warning to the maintenance department to rectify small problems can save the company a lot of money in repairs and production costs.

6. Impress how important it is to maintain and service the cleaners correctly.

SECTION 7 - ROUTINE MAINTENANCE AND SERVICE

Although the HDRBC requires only minimal 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.

CAUTION! **DO NOT REACH INTO THE CONVEYOR UNDER ANY CIRCUMSTANCES WHILST THE CONVEYOR IS RUNNING.**

ROUTINE EXTERNAL INSPECTION

Step 1. Visually inspect the condition of the HDRBC. Observe the condition and action of the cleaner with the belt running. If vibration or other unusual conditions exist, shutdown the conveyor and carry out a Shutdown Service as described below.

Step 2. Observe the condition of the blade. If necessary (and if plant rules allow it), hose any material build-up from the blade. **DO NOT REACH INTO THE CONVEYOR WHILST IT IS RUNNING.** If the blade is excessively worn or blade to belt contact is not even, shutdown the conveyor and carry out a Shutdown Service as described below.

SHUTDOWN INSPECTION / SERVICE

Step 1. Shut down and lock out the conveyor.

Step 2. Visually inspect the blade. Check the condition of the urethane torsion straps, looking for cracks, cuts or any damage. Check that all fasteners are secure. If the blade is not excessively worn, and straps and fasteners are in good condition, check the tension of the cleaner and if necessary, re-tension as described in Section 4, Step 10. Service completed. If the blade or torsion straps are excessively worn or damaged, proceed.

Step 3. Release the lockscrews on the HDRBC mounts to release tensioning pressure on the HDRBC.

Step 4. Remove the bolts securing the tensioning straps to the HDRBC mainframe. Remove the HDRBC frame and blade assembly from the conveyor enclosure and place in accessible area.

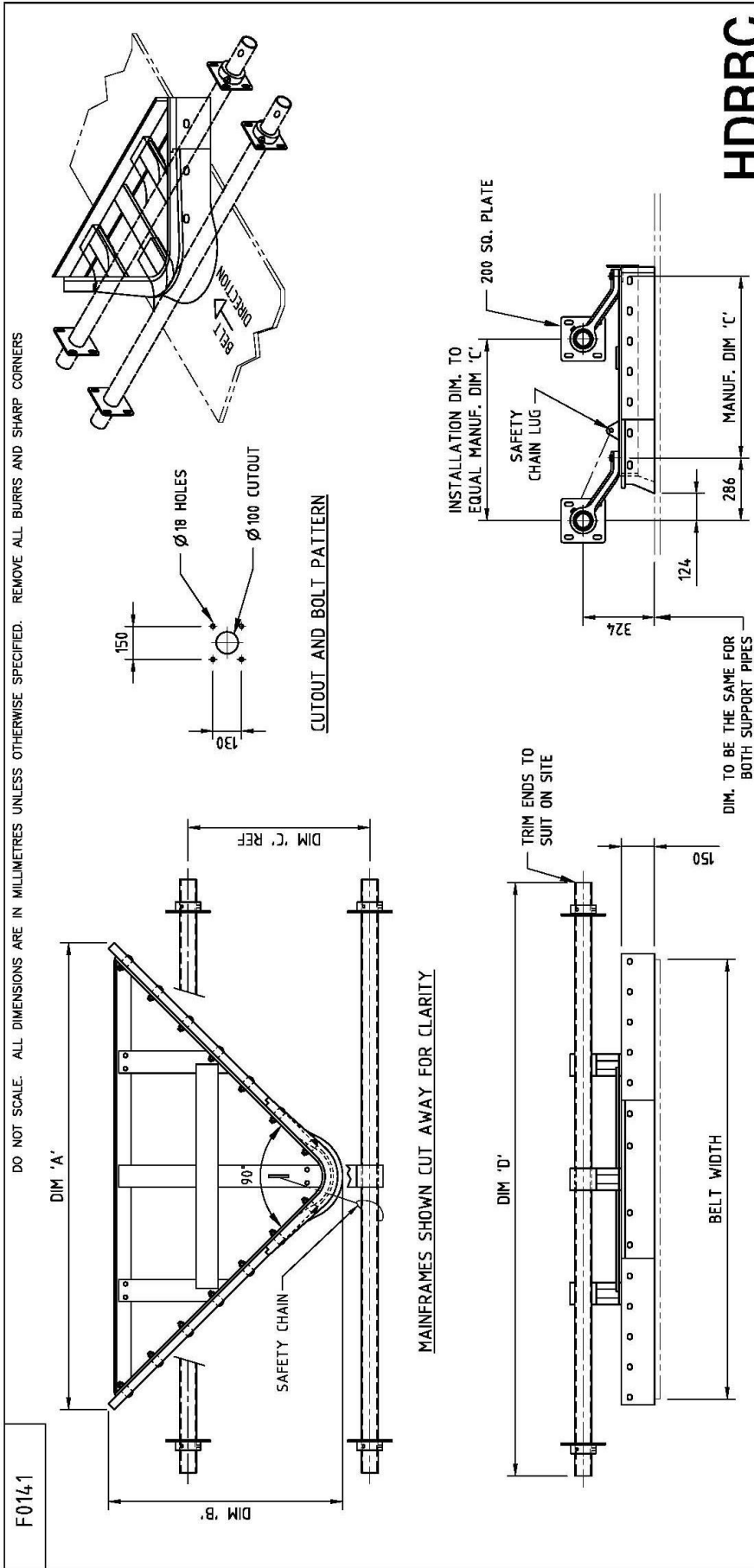
Alternatively, if it is easier to access the HDRBC in-situ, place appropriate packing under the RBC frame to allow removal and replacement of the HDRBC blade.

Step 5. Clean and inspect the HDRBC blade, and replace if necessary. Inspect closely the tensioning straps and replace if damaged. See section 4 for description of HDRBC assembly.

Step 6. Re-install all parts, ensuring that all fasteners are adequately secured. Re-tension the HDRBC as described in Section 4.

Step 7. Remove locks and return the conveyor to service.

SECTION 8 – INSTALLATION ARRANGEMENT DRAWING



HDRBC

BELT WIDTH	900	1050	1200	1350	1500	1600	1800	2000	2200	2400	2500
DIM 'A'	1000	1150	1325	1470	1625	1730	1930	2130	2330	2530	2630
DIM 'B'	503	578	665	740	815	870	970	1107	1207	1320	
DIM 'C'	277	352	427	502	577	627	727	827	927	1027	1077
DIM 'D'	1500	1700	1950	2100	2500	2700	3000	3300	3600	3600	

ESS ENGINEERING SERVICES & SUPPLIES
 Ph. 07-5598 1077 Ph. 042-284422 Ph. 09-3703155
 WA
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TITLE: **HEAVY DUTY RBC RETURN BELT CLEANER INSTALLATION ARRANGEMENT**
 DRAWN BY: T.THEW SCALE: NTS DRAWING No. F0141
 CHKD: APPD: DATE: 3/97 REV. F

508 No.

REV	REVISIONS	BY	CHKD	APP	DATE
F	REVISED (CA02004-072)	SD	GC	TT	2/0/04
E	900 & 1050 BW ADDED	SD	GC	TT	1/0/04
D	200, 050 & 1500 BW DIM 'D' WAS NIL	B.P.	S.D.	T.T.	8/7/02
C	TABLE MOD'D	S.D.	R.O.	T.T.	16/8/01
B	BELT WIDTHS ADDED	T.H.	S.D.	T.T.	3/98
A	BELT LIST UPDATED	T.H.	S.D.	T.T.	8/97

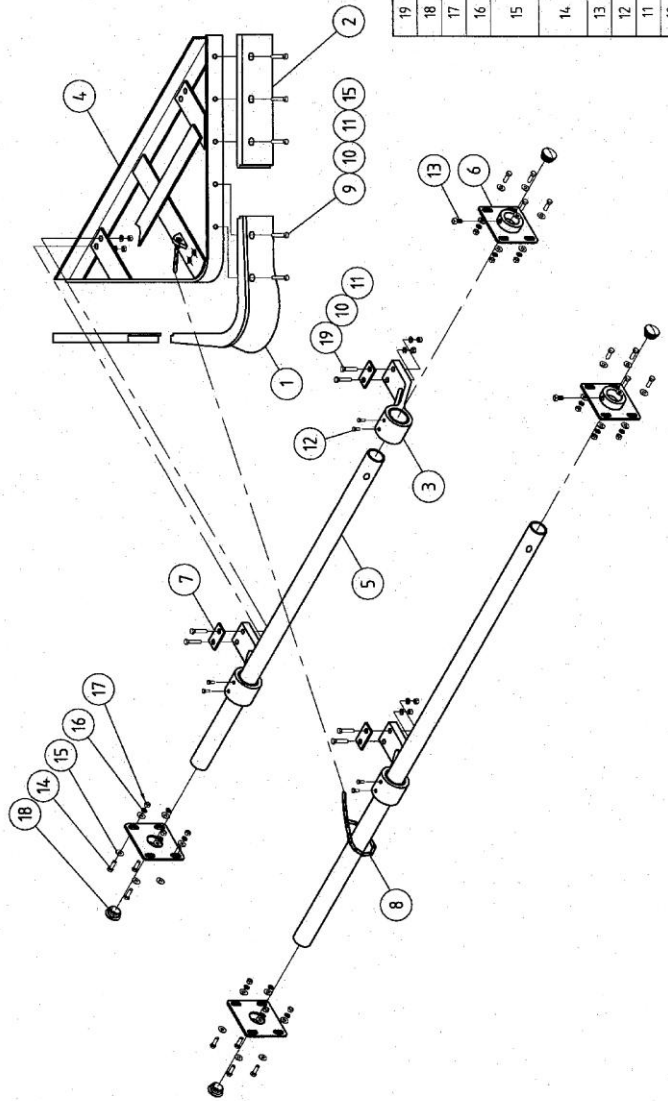
CLIENT: **ESS (CD)**
 LOCATION:

- NOTES:**
- SAFETY CHAIN TO BE CONNECTED TO LUG AT INSTALLATION.
 - POLYURETHANE STRAPS HAVE STEEL CHAIN REINFORCEMENT FOR SAFETY.
 - THE SUPPORT STRAPS APPLY CONSTANT DOWNWARD PRESSURE TO THE NOSE AND TAIL OF THE RBC. THEY ALSO DAMPEN VIBRATION TO KEEP THE RBC IN CONSTANT CONTACT WITH THE BELT.
 - EXPLODED PARTS DRAWING F0147
 - FOR STANDARD DUTY RBC SEE DRAWING F0031.

F0141

SECTION 9 - EXPLODED PARTS DRAWING

DO NOT SCALE. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED. REMOVE ALL BURRS AND SHARP CORNERS



F0147

SUFFIX NOTES

GENERAL

- s = S.S.
- f = FRAS

1. FASTENERS / FITTINGS

- a = ALLOY
- b = BRASS
- c = GALVANISED
- g = HIGH TENSILE
- p = POLY
- s = S.S. (STAINLESS STEEL)
- z = ZINC PLATED

2. URETHANE PARTS

- b = ORANGE BRASSON (BLUF)
- bl = HIGH FRICTION (BROWN)
- f = FRAS MGR (BLACK)
- g = HIGH TEMP (GREEN)

3. PART NO. NOTES

PART No's FOLLOWED BY .xxx INDICATE THAT THE PART IS AVAILABLE IN ALL STANDARD BELT WIDTHS. SUBSTITUTE .xxx WITH BELT WIDTH MEASURED IN cm.

BELT WIDTH	900	1050	1200	1350	1500	1600	1800	2000	2200	2400	2500	2800	3000	3200
BLADE LENGTH	215	322	445	550	657	730	872	1013	1155	1296	1367	1609	1722	1913
No. BLADE HOLES	2	2	2	2	3	3	4	5	5	6	6	8	8	9
PIPE LENGTH	1500	1700	1950	2100	2500	2500	2700	3000	3300	3600	3600	3800	4200	4400
PIPE SIZE	65NB	65NB	65NB	65NB	65NB	65NB	65NB	65NB	65NB	65NB	65NB	65NB	65NB	65NB
BLADE COVER	1000	1150	1325	1470	1625	1730	1930	2130	2330	2530	2630	2970	3130	3400

ITEM	QTY	DESCRIPTION	PART No.
19	6	BOLT M16X80 HEX	02303630(z)(s)
18	4	MAINFRAME PLUG 65NB PLASTIC	02650425p
17	16	NUT M16 HEX	023116(z)(s)
16	16	WASHER M16 SPRING	02319618(z)(s)
15	16+	WASHER 5/8" 304SS	02320458s
14	16	WASHER M16 H/D ZP (L/S 38 O.D)	02319617z
13	4	BOLT M16X50 HEX 304SS	02303610s
12	6	SCREW M16X28 HEX SET 304SS CUP POINT	02315611s
11	16+	SCREW M12X28 HEX SET POINTED 304SS	02315529s
10	16+	WASHER M16	02319616(z)(s)
9	10+	NUT M16 NYLOC	02311618z
8	1	BOLT M16X75 HEX	02303625(z)(s)
7	3	H/D RBC ANCHOR-CHAIN 10X850 ASSY MS	62941010(s)
6	4	H/DUTY RBC WASHER PLATE S/S	62841010S
5	2	H/DUTY RBC MOUNT	09050040(s)
4	1	H/DUTY RBC SUPPORT PIPE	62241xxx(s)
3	3	H/DUTY RBC FRAME	62741xxx(s)
2	1	HD RBC TENSIONING STRAP	62741000(f)
1	1	H/DUTY RBC BLADE	62341xxx10(B)(f)
1	1	H/DUTY RBC SHOVEL NOSE BLADE	624410010(B)(f)

ESS ENGINEERING SERVICES & SUPPLIES
CUSTOMER SERVICE No. 1800 074446

TITLE: HEAVY DUTY RETURN BELT CLEANER - HDRBC

CLIENT: _____ **LOCATION:** _____

REV	DATE	BY	APP'D	REVISIONS
M	18/06/97	T.THEW		EXPLODED PARTS

JOB No. F0147 **SCALE:** NTS **DRAWING No.** F0147 **REV.** M

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SECTION 10

FINAL CHECKLIST

Site: _____ Number: _____ Date: _____

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

Completed By: _____ (Circle Yes or No Below)

1. 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 _____

2. Was this a standard service inspection installation? Yes/No

If No, WHY _____

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

If No, WHY _____

4. Is equipment fit for commissioning? Yes/No

If No, WHY _____

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

If No, WHY _____

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

If Yes, WHAT _____

7. Is equipment performance to Client expectations? Yes/No

If No, WHY _____

ESS Signature: _____ Client Signature: _____