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## TECHNICAL BROCHURE

### CHAININGS FILTER ASSEMBLY FOR USE

### ON ENGINE LUBE OIL APPLICATIONS

### REF. CHO2010L(-) and CHO1210L(-)



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## 1. INTRODUCTION

It has been well documented, that the introduction of fine filtration on hydraulic or lube oil systems has proved to be advantageous in respect of reduced component wear and extended oil life.

The ingredients of particulate or aqueous based contamination in any system, can have serious effects on the integrity of the oil resulting in component fatigue, erosion, corrosion and depletion of oil additive and/or lubricating properties. This in turn, will lead to more than frequent oil changes and maintenance o any system which, in itself, is costly.

Most oil based systems should have filtration packages as specified from design stage, however, it is evident that the need for extra fine filtration can become necessary for even the presence of the smallest particulate contamination below the O.E.M. filtration levels, may influence component wear and oil degradation to beyond the expectations of the end-user.

To compliment the need to maintain a high level of oil system cleanliness, the Chainings Filter product may be installed.

Housed in a simple, yet rugged design, the unique filter element media provides the ability to reduce and maintain contamination levels, be it particulate or water based, to a high degree of oil system cleanliness.

To compliment the Chainings Filter product, a strict quality system is installed to;

**“Ensure that whoever the customer is and whatever their requirements, an assured product is supplied to expectations in terms of value, efficiency and time”**

**Note:** The Chainings Filter product is suitable for use on a wide range of mineral oils and a certain amount of synthetic fluids may also be filtered after consultation with the manufacturer.

However, there are types of fluids that cannot be cleaned using the Chainings filter which include the following:

- Oils or fluid with properties that may corrode the Chainings product seal and any associate pipework. e.g. Phosphate Esters.
- Oils or fluids with sufficient water based properties that may be reduced as a result of the Chainings filter element retention. e.g. Fire Resistant Fluids.

It is advisable to contact the manufacturer before cleaning oils or fluids where the characteristics are not known.

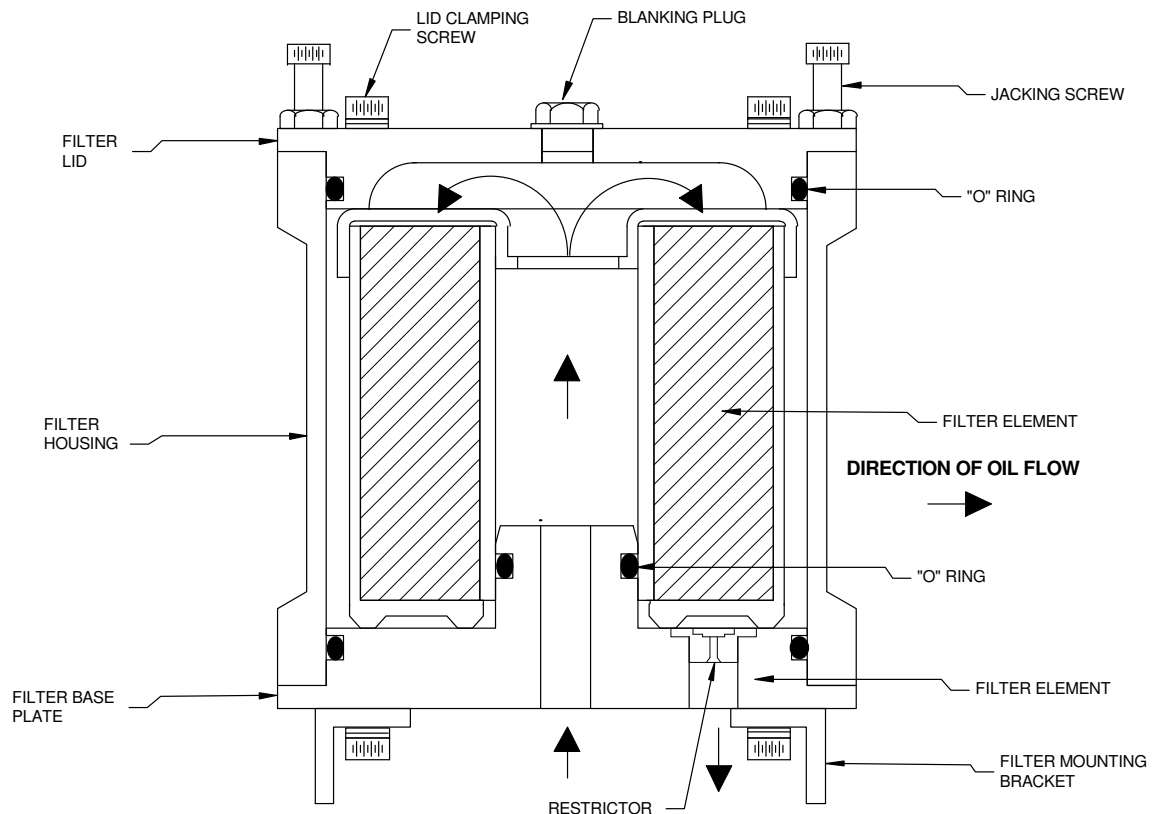
## 2. PRODUCT FEATURES

2.1 Filter Housing A suitably sized Pressure Vessel consisting of a three major part assembly. With emphasis on the resistance to corrosion, this simple, yet rugged design, incorporates BSP tapped ports for connection of the filter to the oil system that is to be cleaned. The fine machined tolerances, whilst providing a superior sealed unit, also allows for the easy adaptation of valve or gauge manifolds that may be required as part of the 'Chainings' product range. Facilities exist for the decaying of pressure and the easy assistance of filter lid removal when changing the filter element. Mounting facilities are also featured to install the filter assembly into the optimum position.

2.2 Filter Element Based on the 'Scroll' type design, the filter element consists of a unique and patented, 'Alpha-Cellulose' material which is wound onto a robust centre core using a constant applied tension and sealed in a rigid 'Polypropylene' shroud and end cap. When fully assembled into the filter housing, this assembly, along with the 'Base Plate' spigot 'O Ring' seal which locates onto the centre core, is so designed to ensure that all fluid flowing through the filter, passes exclusively through the media.

2.3 Restrictor A 1/4" BSP Special fitting made from Stainless Steel and located on the outlet port of the filter assembly. It's purpose is to ensure that engine oil pressure is maintained at all times.

**Note: This component is factory fitted using special tooling. Do not remove in any event.**



**Section through Filter**

### 3. PRINCIPLE OF OPERATION AND SELECTION

The concept of the Chainings filter product, is to remove contamination that may be present in the oil of the system that is to be cleaned. This is achieved by connecting the Filter Assembly to the system under constraints listed in Sections 4 and 5 of this manual. Oil within the system, will travel through the centre of the Chainings filter assembly and, subsequently, pass through the filter media before returning to the system via the Outlet port. The pore structure and absorbent characteristic that the filter media possesses, helps to trap particulate matter and water based contaminants as the oil flows through, without “media migration” and without affecting the oils additive package. Seals are incorporated into the design that help to prevent any oil bypassing the filter media.

To achieve the desired level of cleanliness, it will necessary to pass the oil through the filter media, several times. Experience has shown, that to effectively remove contamination to a high level of cleanliness, ten passes of oil through the filter media is required.

This is of course, dependant on the level of contamination to start with, but does act a as a general guide.

The table below, provides a general guide to the correct selection of Filter Assembly for the relevant size engine oil sump capacity. The Filter Elements are replaced at the change intervals as recommended in Section 4. However, if a positive indication of Filter blockage is required before the element change is due, then the CRIBS system may be installed. This product benefits the end user where permanent damage or oil degradation can occur if severe contamination is present. e.g. Water/Glycol leakage into the engine oil system.

<b>FILTER ASSY. PART NO.</b>	<b>ENGINE OIL CAPACITY</b>
CHO1210L	Maximum 50 Litres (11 Gallons)
CHO2010L	Maximum 100 Litres (22 Gallons)

## 4. INSTALLATION

### i) Location of the Chainings Filter Assembly;

Once the correct size or type of Chainings filter has been selected, the position(s) of the assembly is to be determined. This is normally left to the discretion of the installation engineer and/or the end-user. As a general guide, the following is recommended;

For light commercial vehicles, the filter assembly is mounted inside the engine compartment. The mounting bracket, (If supplied with the assembly) should be fixed to the inside of one of the front wings or any convenient bulkhead by drilling holes and using the appropriate size fastenings. Consideration should be given to the amount of clearance provided to remove the filter element from the assembly.

For heavy commercial vehicles and “off highway” plant, the filter assembly may be mounted in the same manner as above or fixed direct onto the vehicle’s chassis. Care must be taken to ensure that the filter assembly does not impede any mechanical movements of the vehicle design. e.g. Tilting cab.

In both cases, the mounting bracket may be welded direct to the whole vehicle where it is not possible to drill and secure with fastenings, but this must be agreed with the customer and any electrics must be fully **isolated** before proceeding to weld.

**NOTE: Do not locate the filter assembly in any area that is subject to frequential vibration.**

**e.g. Direct on to the engine.**

Once the mounting bracket is secured, the filter assembly may be bolted on using the fastenings supplied. Normally, the assembly is mounted in an upright position to minimise oil spillage when replacing the filter element although this is not essential for the efficient operation of the filter.

For vehicles using the Indicated Blockage system (CRIBS), ensure the alarm console is securely mounted in the operator’s cabin where the indicator lights are in full view of the operator.

### ii) Connection of the Chainings Filter Assembly:

The filter assembly relies on pressure to feed the oil through the element before returning back to the engine. Therefore, a suitable connection point to the engine oil system high pressure side must be found. Likewise, a facility must be found to return the oil back to the engine oil system low pressure side. (For guidelines, see Sht 9.)

Connection points for the feed to the Chainings filter (Engine oil H.P side) may, in order of preference, be found as follows;

- Blanked port connected through into the engine oil gallery.
- Blanked port connected through into existing standard oil filter manifold.
- Oil pressure Warning switch or gauge connection point.

To connect to any of the existing blanked ports, remove the blanking plug and replace with a Male/Male adaptor with compatible thread on one end and ¼” BSP pipe thread on the other end. If connecting into the Oil pressure switch or gauge point, use a suitable “tee” piece adaptor with compatible threads which can be assembled between the engine take-off point and the pressure switch/gauge. The adaptor should have a ¼” BSP port.

#### 4. INSTALLATION Cont.

Ensure that the appropriate method of sealant conforms to the engine take-off point and any of the adaptors used. e.g. Bonded Seal, Tapered thread fitting etc.

**NOTE: Do not connect to any of the Turbo lubrication system on Turbo Charged Engines.**

**Also ensure that pressure is not starved from the oil Warning switch or gauge as a consequence of connecting the Chainings filter feed to the engine take-off point.**

Once the optional pressure port has been selected, a ¼" Bore hose assembly of the appropriate length and with swaged hose ends, can be assembled between the adaptor and the feed port on the Chainings filter. A ¼" BSP Male/Male adaptor and Bonded seal fitted into the ¼" BSP Female port of the filter assembly will be required.

Connection points for the return of oil from the Chainings filter into the engine oil system low pressure side (Return) may, in order of preference, be selected as follows;

- Blanked port connected through into the oil sump. e.g. Dummy dipstick port.
- Camshaft follower inspection plate.
- Valve rocker box or camshaft cover.
- Oil filter pipe.

NOTE: Although not essential, it is recommended that, the return of oil from the filter should be directed back slightly under the normal engine oil level and as far away from the oil pump pick-up as possible. This will facilitate good circulation of oil in the sump.

To connect to an existing blanked port, remove the blanking plug and replace with a Male/Male adaptor with the compatible thread on one end and ¼" BSP pipe thread on the other end. Utilising an inspection cover, rocker box cover or oil filler pipe, may involve the modification to either of these components to provide access for the return of oil. If so, the following steps must be taken;

- Permission from the customer or owner of the vehicle must be sought before carrying out any such modifications.
- An optional position to provide a ¼" BSP tapping through the component for the assembly of a suitable fitting must be found after considering the following;
  - a) That the prime position should be opposite the valves and directly over the oil drain.
  - b) That the returning oil from the filter, does not flow directly over any valves as this may cause the oil to be drawn down the valve stem and into the combustion chamber.
  - c) That the subsequent assembly of a suitable fitting does not protrude and contact any fixed or moving parts within the engine.
  - d) That if the component to be drilled and tapped has a thin wall section, then a bulkhead fitting (i.e. ¼" Male/Extended Male with Locking ring) should be used with an appropriate seal on both faces.
- Any component that is modified, must be removed from the engine. Subsequently, the component must be correctly refitted after ensuring that the existing gaskets or seals are not damaged and are free of any debris.

Once the optional return port has been fitted, a ¼" bore hose of the appropriate length and with swaged hose ends, can be assembled between the return connection and the ¼" BSP Male thread on the filter assembly.

#### 4. INSTALLATION Cont.

**NOTES:**        **The hoses to and from the filter must be kept away from hot engine areas and any moving components.**  
**Hoses and fittings used, must conform to specifications governed by either, or both the customer and any legislative authority.**  
**If this is not applicable, then the hoses and fittings must be suitable for use with the oil being filtered and conform to 1.5 times the subjected pressure and temperature values.**  
**Layout of the hoses should conform to the hoses manufacturers specification. e.g. Hose bend radius.**  
**To maximise the flow of oil through the filter, the bore of the hosing should be increased to 3/8" if lengths exceed 2 Metres.**

##### iii) Testing the System:

Before the Chainings filter is finally connected to the engine oil system, it is recommended that the following procedure should be carried out;

1. Check the engine oil pressure from the filter "take-off point" and record.
2. Remove the engine oil sump plug and drain the existing oil.
3. Change the standard engine oil filter.
4. Ensure the filter element is installed in the Chainings filter assembly.  
(Refer to Section 6, Filter Element Change Procedure)
5. Connect the Chainings filter to the engine oil system.
6. Replace the oil sump plug.
7. Fill the engine oil system with the appropriate oil and to the correct level.
8. Start and run the engine for approximately 3 minutes.
9. Check the engine oil pressure and record. (It is advisable to record the pressure with a Pressure gauge connected into the feed to the filter. Remove when pressures have been noted)
10. For vehicles using the Indicated Blockage system (CRIBS), check the operation of the Alarm Console L.E.Ds via the "Test" button. (Refer to the appropriate Technical brochure for full operation of the CRIBS system.)
11. Stop engine and check the oil level. Fill the system if necessary to the correct level.
12. Restart and run the engine until the normal running temperature has been achieved.
13. Check for any oil leakages and rectify if necessary.



#### 4. INSTALLATION Cont.

iv) Filter and Oil change intervals:

Once the Chainings filter has been installed and unless supported by oil analysis, the following filter change intervals are recommended: (Refer to Section 6, Filter Element Change Procedure)

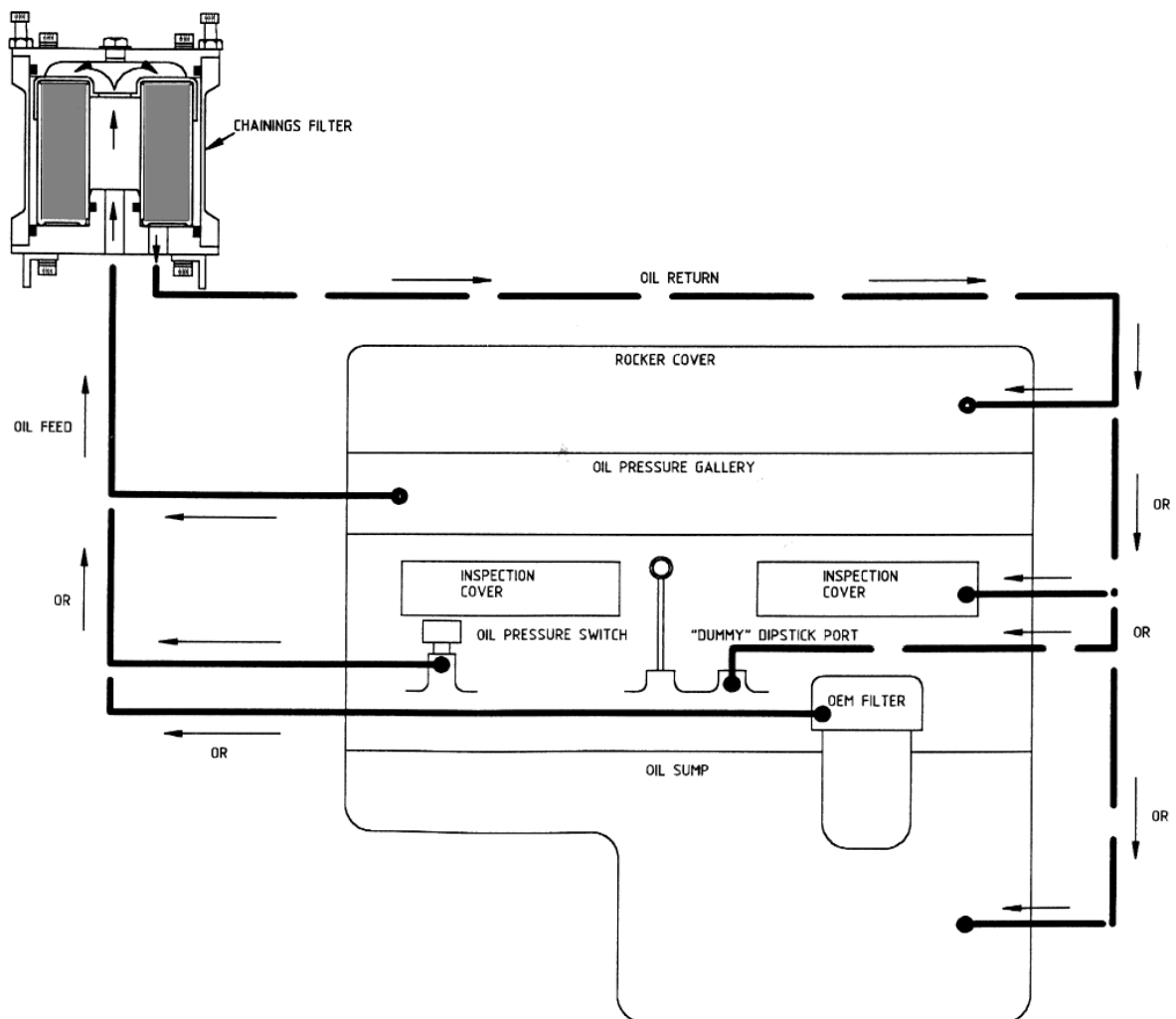
<b>First element change</b>	<b>3000 miles (4800 Kms) or 100 Hours</b>
<b>Second element change</b>	<b>6000 miles (9600 Kms) or 200 Hours</b>
<b>Thereafter subsequent element changes</b>	<b>15000 miles (24000 Kms) or 500 Hours</b>

**NOTE:** The first and second element change periods are so advised to “clean up” any debris from a potential contaminated system prior to the installation of the Chainings filter.

For the Oil change intervals, unless oil analysis permits further use, the following is recommended;

**Multigrade and single series oils with TBN value of 8 minimum to be changed at 30000 miles (48000 Kms) or 1000 hours**

**Multigrade and single series oils with TBN value of 8 maximum to be changed at 15000 miles (24000 Kms) or 500 Hours**



## 5. SPECIFICATIONS

Filter Assembly Part No:		CHO2010L←
Filter Element Part No:		OCH2010↑
Weight (Filter Housing):		14 Kgs
Weight (Filter Element):		1.2 Kgs
Oil Displacement Volume:		2.5 Litres
Water Retention:		450ml
Dirt Holding Capacity (Carbon Black “Ebonex 237”)		200grms
Size (Space Allowance, incl. Element removal):		230mm Dia, 300mm Ht
Recommended Working Pressure:		3 to 5 Bar
Maximum Working Pressure:		10 Bar
Pressure Safety: Factor		1.5 Times Max. Working Pressure
Nominal Flow Rate at 3Bar:		2Lpm
Maximum Temperature (Oil):		80Deg C
Inlet Port Size (Centre):		¼” BSP
Outlet Port Size (Outer):		¼” BSP
Material Spec.	Filter Housing:	Cold Drawn Seamless STS2 Din2391
	Base Plate and Lid:	EN43
	“O” Ring (Lid and Base):	Viton 75→
	“O” Ring (Centre Tube):	Viton 75→
	Fastenings:	Stainless Steel Austenitic
Protective Treatment (Filter Hsg, Base and Lid):		Electrophoretic Paint (Ref. TWB7900/pt & Post Cure)
Clamping Nut Torque:		20Nm
Recommended Attachment Bolt Size:		M10 (4 positions)↓
Additional Options:		- Standard Build
		A Isolation Valve Kit
		B CRIBS System

### NOTES:

- ← Letters suffixed to the main Part Number, denote optional extras are fitted as listed above.  
e.g. CHO2010LB is a Chainings size 203mm Filter Assembly for use on Engine Lube oil applications and supplied with the CRIBS system.
- ↑ To order filter elements, quote OCH2010.
- To order Spares Seal Kits, quote CSK2010 (Comprising 1 off each, Lid Seal and Centre Tube Seal).

**NOTE: This product is fully tested to specifications before it leaves the manufacturers premises. Should any queries or problems arise, then the manufacturer should be contacted immediately. Adjustments made to the product without prior knowledge of the manufacturer may invalidate any warranty claims.**

## 5. SPECIFICATIONS Cont.

Filter Assembly Part No:		CHO1210L←
Filter Element Part No:		OCH1210↑
Weight (Filter Housing):		7 Kgs
Weight (Filter Element):		0.45 Kgs
Oil Displacement Volume:		1.5 Litres
Water Retention:		150ml
Dirt Holding Capacity (Carbon Black “Ebonex 237”)		80grms
Size (Space Allowance, incl. Element removal):		160mm Dia, 300mm Ht
Recommended Working Pressure:		3 to 5 Bar
Maximum Working Pressure:		15 Bar
Pressure Safety: Factor		1.5 Times Max. Working Pressure
Nominal Flow Rate at 3Bar:		0.75Lpm
Maximum Temperature (Oil):		80Deg C
Inlet Port Size (Centre):		¼” BSP
Outlet Port Size (Outer):		¼” BSP
Material Spec.	Filter Housing:	Cold Drawn Seamless STS2 Din2391
	Base Plate and Lid:	EN43
	“O” Ring (Lid and Base):	Viton 75→↓
	“O” Ring (Centre Tube):	Viton 75→↓
	Fastenings:	Stainless Steel Austenitic
Protective Treatment (Filter Hsg, Base and Lid):		Electrophoretic Paint (Ref. TWB7900/pt & Post Cure)
Clamping Nut Torque:		20Nm
Recommended Attachment Bolt Size:		M10 (4 positions)↓
Additional Options:		- Standard Build A Isolation Valve Kit

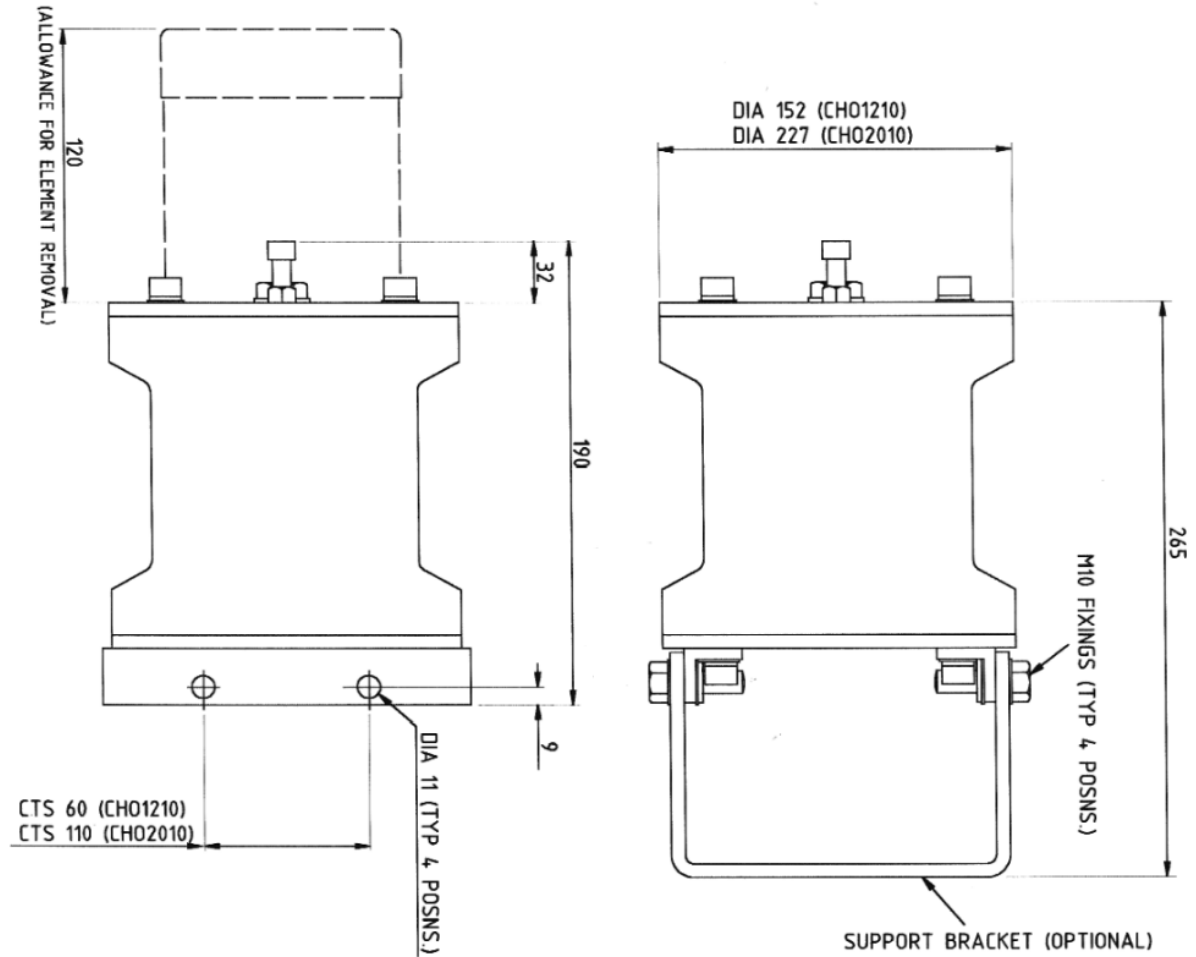
### NOTES:

- ← Letters suffixed to the main Part Number, denote optional extras are fitted as listed above.  
e.g. CHO1210La is a Chainings size 127mm Filter Assembly for use on Engine Lube oil applications and supplied with the CRIBS system.
- ↑ To order filter elements, quote OCH1210.
- To order Spares Seal Kits, quote CSK1210 (Comprising 1 off each, Lid Seal and Centre Tube Seal).
- ↓ To order Filter Support Mounting Kit, quote CHO1210-20

**NOTE: This product is fully tested to specifications before it leaves the manufacturers premises. Should any queries or problems arise, then the manufacturer should be contacted immediately. Adjustments made to the product without prior knowledge of the manufacturer may invalidate any warranty claims.**

## 5. SPECIFICATIONS Cont.

### Filter Assembly Installation Details



Note: Both Filter assemblies have a range of optional mounting brackets which are not shown in the details above.

For more information on these, please contact Chainings Ltd.

## 6. FILTER ELEMENT CHANGE PROCEDURE

### Removal of used element:

1. If fitted, turn the “Inlet” Isolating valve to the Closed position.
2. Gradually loosen the Steel Blank fitted to the Filter Lid, to decay any residual pressure.  
**WARNING: Care should be taken to avoid the risk of oil contacting the operator in the event of undue pressure being released.**
3. If fitted, turn the “Outlet” Isolating valve to the Closed position.
4. Loosen and remove the M8 clamping screws, spring washers and plain washers securing the lid to the Filter Housing.
5. Unlock the nuts fitted to the underside of the two M8 bolts located on the Filter Lid and screw the bolts downwards to assist with removal of the Lid.
6. Once the Filter Lid has been removed, pull the filter element upwards and away from the Filter Housing.
7. Dispose the filter element in accordance with any legislative procedures that may be applicable.

### Installation of new element

1. Ensure that the Filter Housing is clean and free of contaminates and that the “Inlet” and “Outlet” ports are not blocked.
2. Ensure that the “O” Ring on the Centre Tube is correctly positioned and not damaged.
3. Install the replacement Filter Element and ensure that it is seated firmly at the bottom of the Filter Assembly.
4. Ensure that the “O” Ring on the Filter Lid is correctly positioned and not damaged.
5. Apply a film of clean oil around the “O” Ring on the Filter Lid and ensure that the ends of the two bolts used for extraction purposes, are not
6. protruding through the bottom of the Filter Lid.
7. Line the holes in the Filter Lid up with tappings in the Filter Housing and press down to locate the lid.
8. Replace the Clamping screws, Spring washers and Plain washers and Torque tighten each screw in a diagonal fashion, to 20Nm.
9. Hand tighten the two bolts on the Filter Lid and lock to the lid with the nuts fitted to the underside of each bolt. **Note: The filter element has been designed to compress as the lid is being tightened down.**
10. Tighten the Steel Blank fitted to the Filter Lid.
11. If fitted, turn the “Inlet” and “Outlet” Isolating valves to the “Open” position.

**WARNING: ALWAYS USE GENUINE CHAININGS FILTER ELEMENTS**