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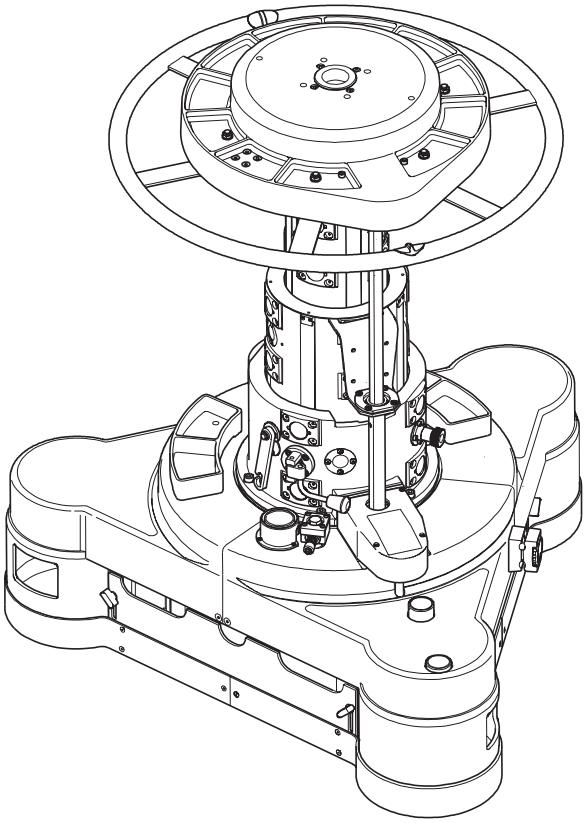
# Maintenance Manual

# Fulmar Pedestal



Vinten

Camera Control Solutions

# Fulmar

## PEDESTAL
## 3702

## MAINTENANCE MANUAL
## AND
## ILLUSTRATED PARTS LIST

### PUBLICATION PART No. 3702-9

### ISSUE 14

# Foreword

This manual provides full and detailed maintenance and spare parts information for the Vinten® Fulmar pedestal. The Fulmar pedestal is an obsolete product and this Maintenance Manual is provide for the final production version.

**WARNING!: Read the Safety Section on page 5 before using this pedestal or attempting any adjustment or repair.**

It is recommended that this manual is read carefully and the illustrations studied prior to operating or servicing the pedestal. Attention to the details contained herein will ensure that the pedestal will operate efficiently with the minimum of attention over a long service life. Particular attention must be paid to cleaning, especially after use in adverse conditions.

To order spare parts or to obtain further information, application should be made to Vinten Broadcast Limited or to your local distributor, or visit our website at www.vinten.com.

# Notes to readers

This is an on-line version of ‘Fulmar Pedestal Maintenance Manual’ (3702-9). The Fulmar pedestal is an obsolete product and this Maintenance Manual is provide for the final production version.

# Navigation

Clicking the mouse on any blue text will move you around the document. For example, if you click on one of the blue call-outs on an exploded drawing, you will be taken to the appropriate line in the relevant parts list.

Contents Clicking here will take you to the Contents Page.

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Alternatively, you may use the Acrobat Reader navigation buttons.

# Safety - Read This First!

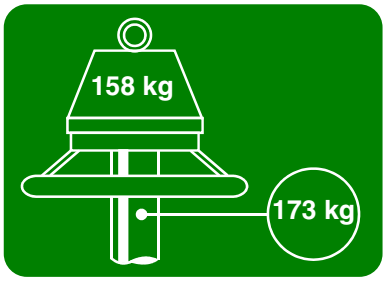
## Warning symbols in this maintenance manual

Where there is a risk of personal injury, injury to others, or damage to the pedestal or associated equipment, comments appear, highlighted by the word **WARNING!** and supported by the warning triangle symbol.

## Warning symbols on the pedestal

On encountering the warning triangle and open book symbols it is imperative that you consult this maintenance manual before using this pedestal or attempting any adjustment or repair.

## Critical data

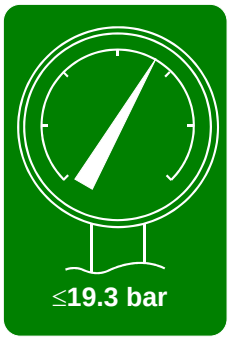



### Mass

| | | |
|---|---|---|
| **Pedestal** | **173 kg** | **(383 lb)** |
| **Trim weights (total)** | **7.5 kg** | **(16.5 lb)** |

### Load

| | | |
|---|---|---|
| **Minimum Load** | **23 kg** | **(50 lb)** |
| **Maximum Load** | **158 kg** | **(350 lb)** |




### Pressure

| | | |
|---|---|---|
| **Maximum pressure** | **19.3 bar** | **(280 psi)** |

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# Abbreviations

The following abbreviations are used in this publication:

| | | | |
|---|---|---|---|
| ac | alternating current | lb | pound (weight) |
| A | Amps | LF | Lubricated Friction |
| AF | across flats | LH | left hand |
| A/R | as required | MISO | metric thread |
| ASME | American Society of Mech Engineers | m | metre |
| assy | assembly | mm | millimetre |
| BS | British Standard | N | Newton |
| BA | British Association thread | NPT | National Pipe thread |
| BSF | British Standard Fine thread | NI | not illustrated |
| BSP | British Standard Parallel Pipe thread | No. | number |
| BSW | British Standard Whitworth thread | OD | outside diameter |
| btn | button | PCB | printed circuit board |
| chs | cheese | PCD | pitch circle diameter |
| C of G | centre of gravity | pozi | Pozidriv |
| comp | compression | psi | pounds per square inch |
| csk | countersunk | pt | point |
| cu | cubic | PTFE | Polytetrafluoroethylene |
| c/w | complete with | PVC | Polyvinyl chloride |
| dc | direct current | RH | right hand |
| dia | diameter | sect | section |
| ft | foot | skt | socket |
| hd | head | SWG | standard wire gauge |
| hex | hexagon | thk | thick |
| Hz | Hertz (frequency) | UNC | Unified Coarse thread |
| IC | integrated circuit | UNF | Unified Fine thread |
| ID | inside diameter | V | Volts |
| in. | inch | W | Watts |
| kg | kilogram | | |

# Technical Specification

**NOTE: The drawings in this section are provided only as a guide to construction and material in the pressurized parts of the pedestal. They should NOT be used for dismantling and assembly or the ordering of spare parts. Please refer to Section 5 - Repair or Section 6 - Illustrated Parts List.**

Weight . . . . . 173 kg (383 lb)

Overall Dimensions

- Maximum height . . . . . 149.5 cm (59 in.)
- On-shot stroke . . . . . 77 cm (30 in.)
- Doorway width
  - Minimum . . . . . 86.5 cm (34 in.)
  - Maximum . . . . . 99 cm (39 in.)

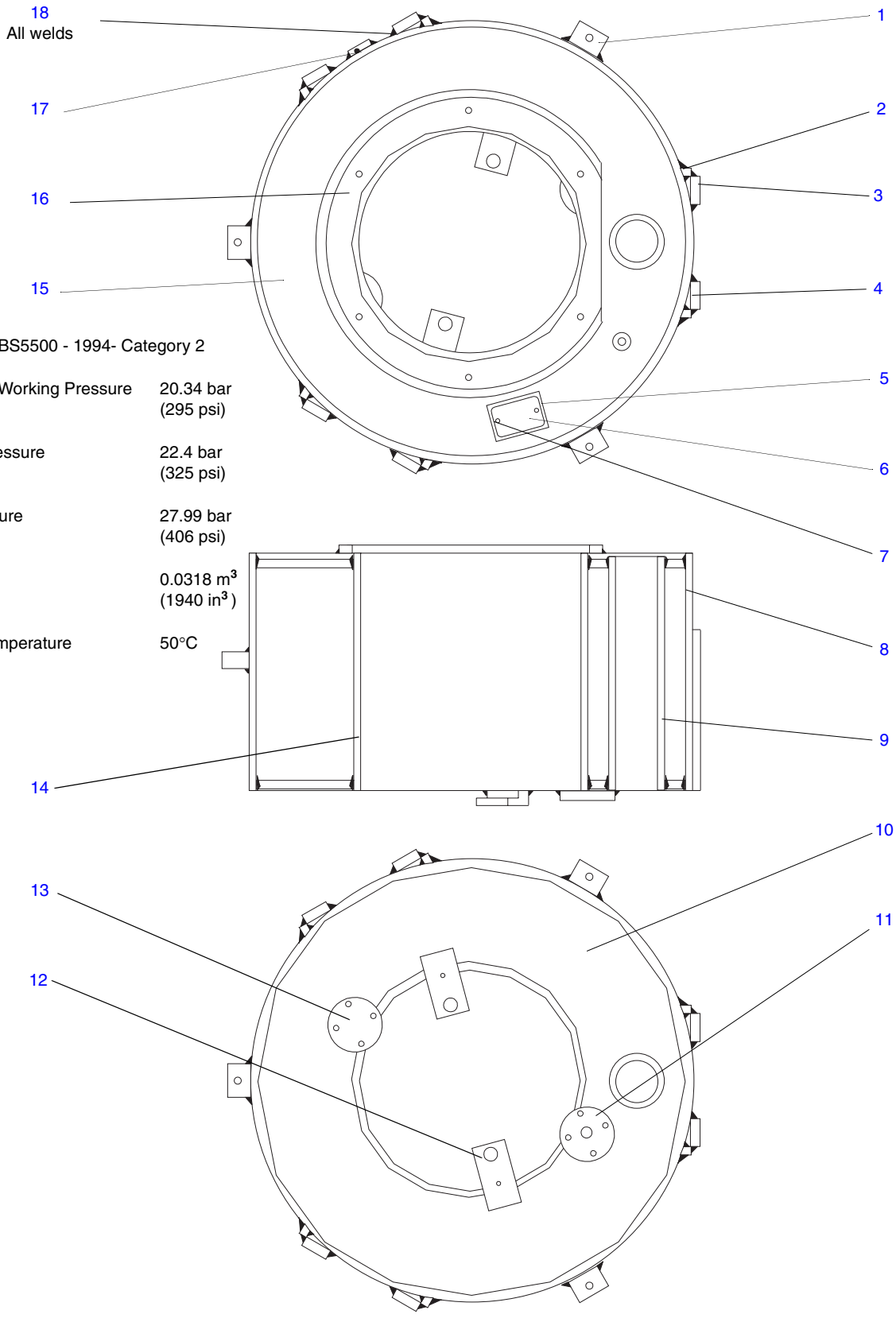
Payload

- Minimum . . . . . 23 kg (50 lb)
- Maximum . . . . . 158 kg (350 lb)

Pneumatic system

- Maximum Working Pressure . . . . . 20.34 bar (295 psi)
- Design Pressure . . . . . 22.4 bar (325 psi)
- Test Pressure . . . . . 27.99 bar (406 psi)

# Pressure Tank Assembly (Part No. 3702-42)




Standard: BS5500 - 1994- Category 2

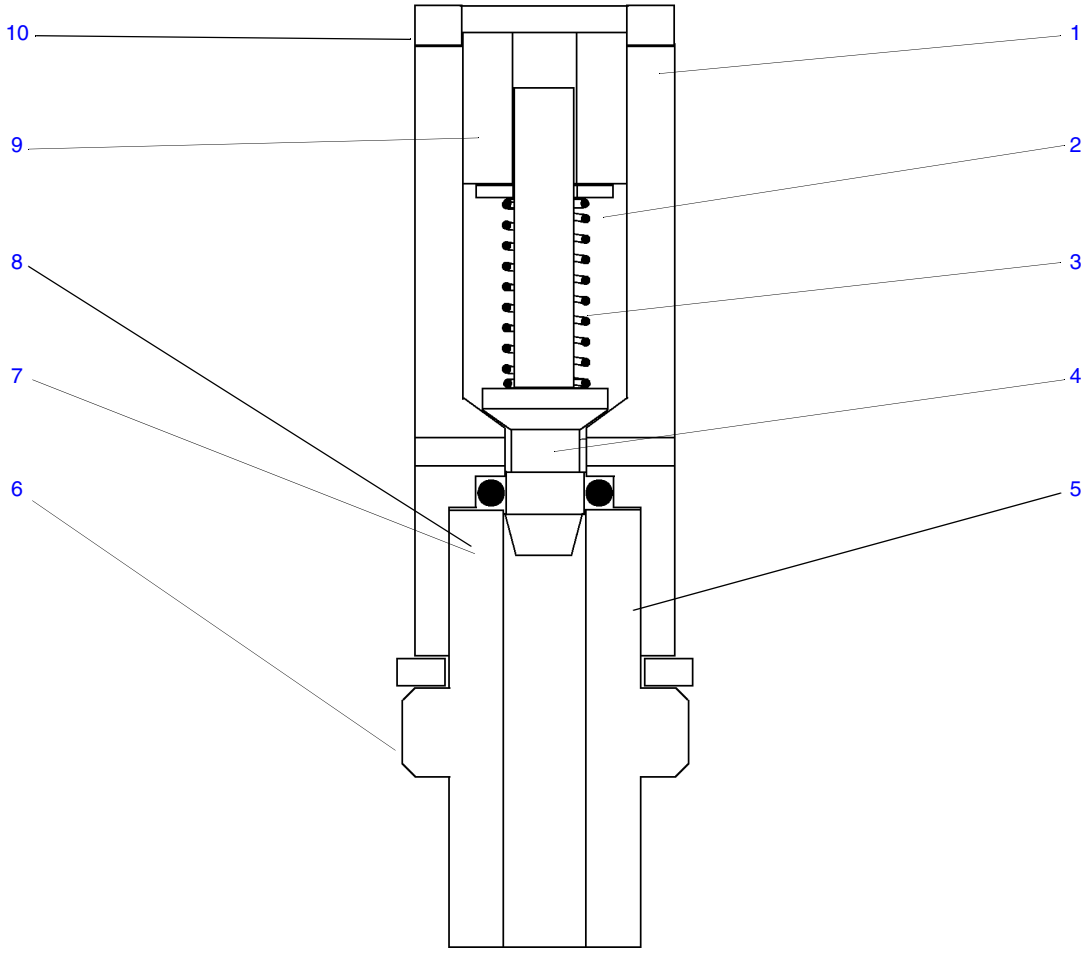
| | |
|---|---|
| Maximum Working Pressure | 20.34 bar (295 psi) |
| Design Pressure | 22.4 bar (325 psi) |
| Test Pressure | 27.99 bar (406 psi) |
| Volume | 0.0318 $m^3$ (1940 $in^3$) |
| Design Temperature | 50°C |

## Pressure Tank Assembly (Part No. 3702-42)

| Item | Name | Qty | Material |
|---|---|---|---|
| 1 | Pad | 3 | Mild steel to BS970 non-lead bearing |
| 2 | Packing strip | 6 | Mild steel to BS970 non-lead bearing |
| 3 | Leg mounting (RH) | 3 | Mild steel to BS970 non-lead bearing |
| 4 | Leg mounting (LH) | 3 | Mild steel to BS970 non-lead bearing |
| 5 | Mounting block | 1 | Mild steel to BS970 non-lead bearing |
| 6 | Nameplate | 1 | 22 SWG Aluminium sheet |
| 7 | Hammerdrive screw | 2 | Type U hardened, 00 x 1/8 in. |
| 8 | Outer shell | 1 | 20 in. OD x 1/4 in. thick mild steel plate to BS1501-151 GR403A * |
| 9 | Tube | 1 | 2 3/8 in. OD x 3/16 in. wall steel tube to BS1501-HFS S360 * |
| 10 | End plate (lower) | 1 | 19 7/16 in. x 1/2 in. thick mild steel plate to BS1501-151 GR403A * |
| 11 | Pad | 1 | Mild steel to BS970 non-lead bearing |
| 12 | Anchor plate | 2 | Mild steel to BS970 non-lead bearing |
| 13 | Pad | 1 | Mild steel to BS970 non-lead bearing |
| 14 | Inner shell | 1 | 10 3/4 in. OD x 1/4 in. wall steel tube to BS1501-HFS S360 * |
| 15 | End plate (upper) | 1 | 19 7/16 in. x 1/2 in. thick mild steel plate to BS1501-151 GR403A * |
| 16 | Flange | 1 | Mild steel to BS970 non-lead bearing |
| 17 | Relief valve mounting insert | 1 | Mild steel to BS970 non-lead bearing |
| 18 | Welding wire | A/R | 1.0 mm mild steel BS2901 Part 1:1983A18 * |

*Material fully certified and covered by mechanical and chemical certificates

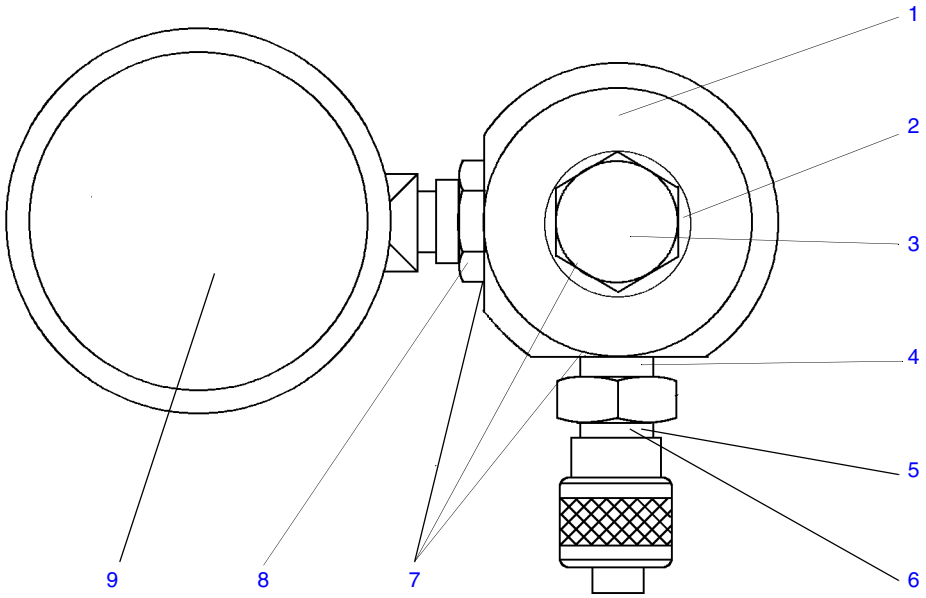
## Safety Valve Assembly (Part No. 3702-26)




## Relief Valve Assembly (Part No. 3374-13)

| Item | Name | Qty | Material |
|---|---|---|---|
| 1 | Body | 1 | Brass, BS2874 CZ121 Pb4 |
| 2 | Small washer | 1 | 2BA |
| 3 | Spring | 1 | Flexo Ref 143306 |
| 4 | Spool | 1 | Stainless steel EN56AM |
| 5 | Spigot | 1 | Stainless steel EN56AM |
| 6 | Bonded seal | 1 | 1/4 in. BSP, Dowty Ref PP-45-B |
| 7 | ‘O’ ring | 1 | Gaco Ref R2025 |
| 8 | Silicone grease | A/R | MS4 |
| 9 | Adjuster | 1 | Stainless steel EN58 |
| 10 | Locking nut | 1 | Brass, BS2874 CZ121 Pb4 |

## Pressure Gauge Assembly (Part No. 3702-33)
## Pressure Gauge Assembly (USA) (Part No. 3054-11)




## Pressure Gauge Assembly (Part No. 3702-33)
## Pressure Gauge Assembly (USA) (Part No. 3054-11)

| Item | Name | Qty | Material |
|---|---|---|---|
| 1 | Banjo | 1 | Aluminium alloy HE 30 TF |
| 2 | Bonded seal | 2 | 1/4 in. BSP, Dowty Ref PP-45-B |
| 3 | Banjo bolt | 1 | Mild steel BS970 EN1A |
| 4 | Bonded seal | 1 | 2BA, Dowty Ref PP-45-3 |
| 5 | Charging valve | 1 | Modified Part No. J005-020 - Schrader valve No. 9886 |
| 5 | Charging valve (USA only) | 1 | Modified Part No. J005-021 - Schrader tank valve No. 8911 |
| 6 | Valve core | 1 | Schrader valve core No. 230011 |
| 7 | Hydraulic sealant | A/R | Loctite 542 |
| 8 | Adaptor nut | A/R | Brass |
| 9 | Pressure gauge | 1 | Wika 0-400 psi (0-27 bar) 2 in. dia |

# Design Improvements

| Details | Serial No. Information |
| --- | --- |
| | |

Section 1

# Introduction and Description

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## Introduction

1 The Vinten Fulmar pedestal (Fig 1.1) is capable of supporting and counterbalancing a payload weighing between 22.68 kg (50 lb) and 158 kg (350 lb), which provides it with adequate capacity for the majority of cameras, camera mountings, prompters and other accessories.

2 The pedestal has a fully counterbalanced, nitrogen-charged column which may be raised and lowered under hand control. Pedestal motion about the studio is controlled by the cameraman who directs the movement with the steering ring. A foot-operated changeover mechanism allows selection of crab or steer modes of movement.

## Description

### General

3 The major assemblies of the Fulmar pedestal are the telescopic column and the base.

4 The telescopic column is located in a fixed tube secured to the base assembly, and consists of a three-stage extension unit and a two-stage ram. The ram is pressurised by nitrogen stored in a tubular tank and this tank forms the main structure of the base.

5 The pressure of the nitrogen in the ram balances the weight of the moving parts of the pedestal column plus the payload (i.e. the camera and any accessories). When lowering or raising the load the effort applied to the column by the cameraman needs only to overcome the friction of the moving parts and the drag preset by the variable friction control. The column sections are linked internally by cords and chains running over pulleys and sprockets. This system ensures that all three sections extend or retract to the same extent.

6 To balance differing payloads, the nitrogen pressure is either increased or decreased as required. Fine adjustment of the column balance is by means of trim weights (1) which are placed in a circular tray (3) above the steering ring (16). Two storage trays (15) are fitted to the base to hold trim weights which are not in use.

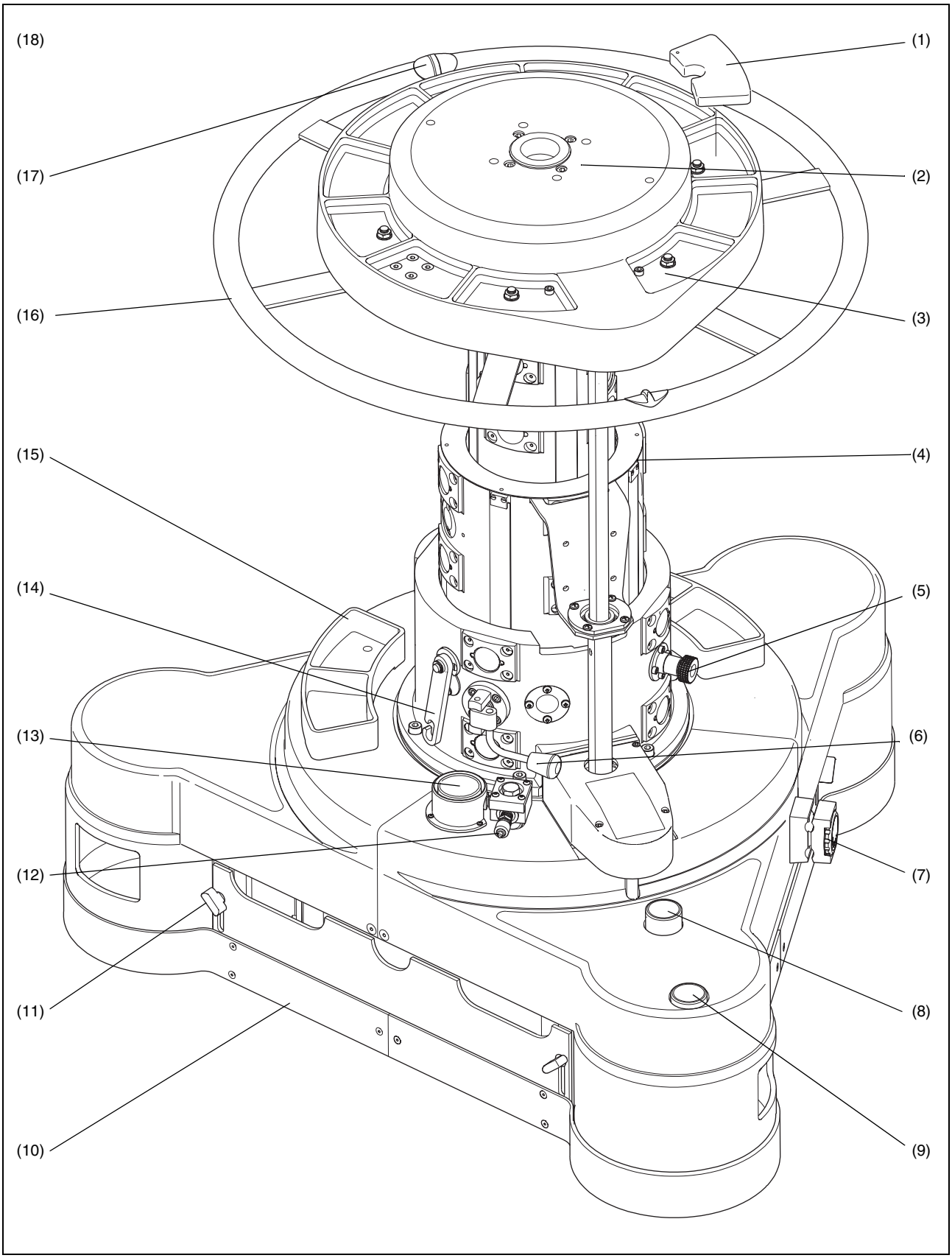


**Fig 1.1 Fulmar pedestal**

7 The pedestal can be easily manoeuvred around the studio. The steering ring (16) is used to turn the pedestal wheels and the steering mechanism provides two modes of operation - crab, where all three wheels turn together, and steer, where two wheels are locked in the straight-ahead position and the third wheel steers independently.

8 The main assemblies of the pedestal are described in more detail below.

## Base

9 The base consists of a robust tubular steel fabrication which forms the nitrogen storage tank and is the frame on which the pedestal is built. On the upper face of the tank there is a machined and tapped flange which provides the mounting face for the fixed tube and on the outer shell are three pairs of equally spaced mountings to which the wheel assemblies are attached.

10 Each wheel unit consists of an alloy housing supporting a twin-wheel axle assembly. The wheel pivot is supported in a pair of ballraces and the upper end of the pivot shaft terminates in a sprocket assembly for the steering mechanism which links all the wheels together by an endless chain. The wheels are rotatable through 360 degrees by means of the steering ring and both the crab and steer modes of movement are controlled by the steering ring, with changeover effected by foot-operated buttons mounted on the base.

11 The wheels are of cast alloy running on ballraces and each is fitted with a low friction, squeal-free tyre.

12 The base unit components are enclosed by contoured covers and side plates. Optional lifting handles may be installed on the covers.

13 A continuous cable guard (10) surrounds the base and is adjustable for height.

## Column

14 The three-stage column (4) is located in a fixed tube secured to the welded pressure tank and consists of three concentric column sections and a two-stage ram.

15 The fixed tube is a static unit bolted rigidly to the base. Four pairs of roller bearings are dispersed around this section at 90 degree intervals, with each pair arranged one at the top and one at the bottom of the column. Two pairs of the bearings are fixed and two pairs are adjustable. The adjustable bearings differ from the fixed units in that they have an eccentric shaft with an adjuster, a clamping arrangement on the bearing housing and a screw to close the clamping arrangement onto the eccentric shaft.

16 The adjustable roller bearings are positioned diametrically opposite the fixed roller bearings and are used to take up any clearance across their individual planes of support thus eliminating any sideplay in the column. The outer and centre tubes of the telescopic column are fitted with the same arrangement.

17 The tubes of the column are linked together by a system of chains and sprockets and cords and pulleys which ensure that, during extension and retraction, the telescopic action is equally distributed between the moving sections. All three stages have hardened steel bearing tracks on the outer surfaces, which correspond with the roller bearings on the inner face of the next lower stage to form the motion guides.

18 The balancing force for the column is provided by a two-stage ram. The movements of the ram stages in relation to each other are controlled by the movements of the outer and middle stages of the column. The ram is connected to the pressure tank via a manifold.

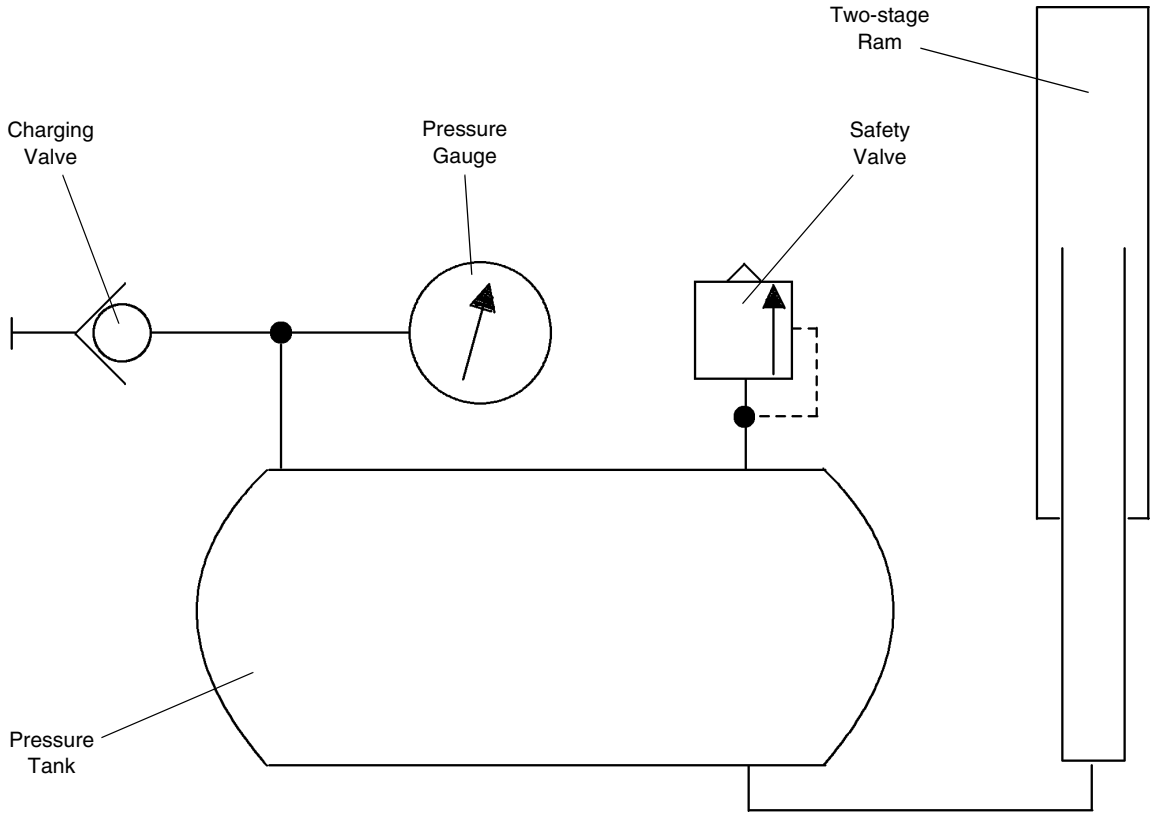


**Fig 1.2 Pneumatic system - schematic diagram**

## Head Mounting Platform

19 The platform consists of a contoured alloy casting attached to the upper stage of the telescopic column. On the top of the platform provision is made for mounting a pan and tilt head (2). On the underside of the platform there are six eccentric shafts carrying nylon rollers which locate the steering ring around the column. The steering mechanism upper section is also fitted to the underside of the head mounting platform as are the brackets and spigots of the locking bar assembly together with the rubber stops.

## Pneumatic System

20 The pneumatic system (Fig 1.2) consists of the pressure tank, the manifold and the two-stage ram. A Schrader-type charging valve and pressure gauge are connected to the top face of the pressure tank by a banjo assembly. A safety valve is screwed into a boss in the side of the tank.

## Section 2

# Operation

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Manoeuvring the pedestal. . . . . 12

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Friction control . . . . . 14

Cable guard . . . . . 15

## General

1 To identify components, please refer to Fig 1.1. For further operating instructions, please refer to Fulmar Pedestal Operators Guide, Publication Part No. 3702-8.

# Putting into service

## Unpacking

2 Unpack the pedestal, ensuring that all transport packing and retaining fixings are removed, in particular the white plastic collar under the weight tray.

**WARNING!: Do not attempt to unlock the platform locking bars until the pedestal load has been fitted.**

3 Ensure that both platform locking bars (14) are retaining the platform in its lowest position.

## Steering mechanism checks

4 There are two foot buttons on the pedestal, one marked CRAB (9) and one marked STEER (8). Bring one of the red indicators (17) on the steering wheel in line with the datum line on the weight tray (3), press the CRAB button and turn the steering wheel. Check that all three wheels turn together and all point in the same direction. Now realign the red indicator, press the STEER button and turn the steering wheel. Check that two of the wheels lock into the straight-ahead position and that the third wheel can still be turned with the steering ring.

## Attachment of pan and tilt heads

5 The following paragraphs provide the necessary information for mounting Vinten and other pan and tilt heads. However, the head should not be fitted to the pedestal until the appropriate point in the charging procedure is reached (Para 9).

### Vinten pan and tilt heads

6 Any type of Vinten head, including remotely operated types, may be fitted to the Fulmar pedestal. Fitting is carried out by placing the head in position, locating the four holes and fitting the four bolts provided.

### Pan and tilt heads using Mitchell-type centre-screw fixing

7 To fit heads using the Mitchell-type centre-screw fixing, it is necessary to fit a stand-off adaptor, Vinten Part No. 3710-3.

8 The adaptor is fixed with the standard four-bolt fixing and enables the centre screw to be secured. Vinten heads can be fitted by means of a centre screw if this is preferred.

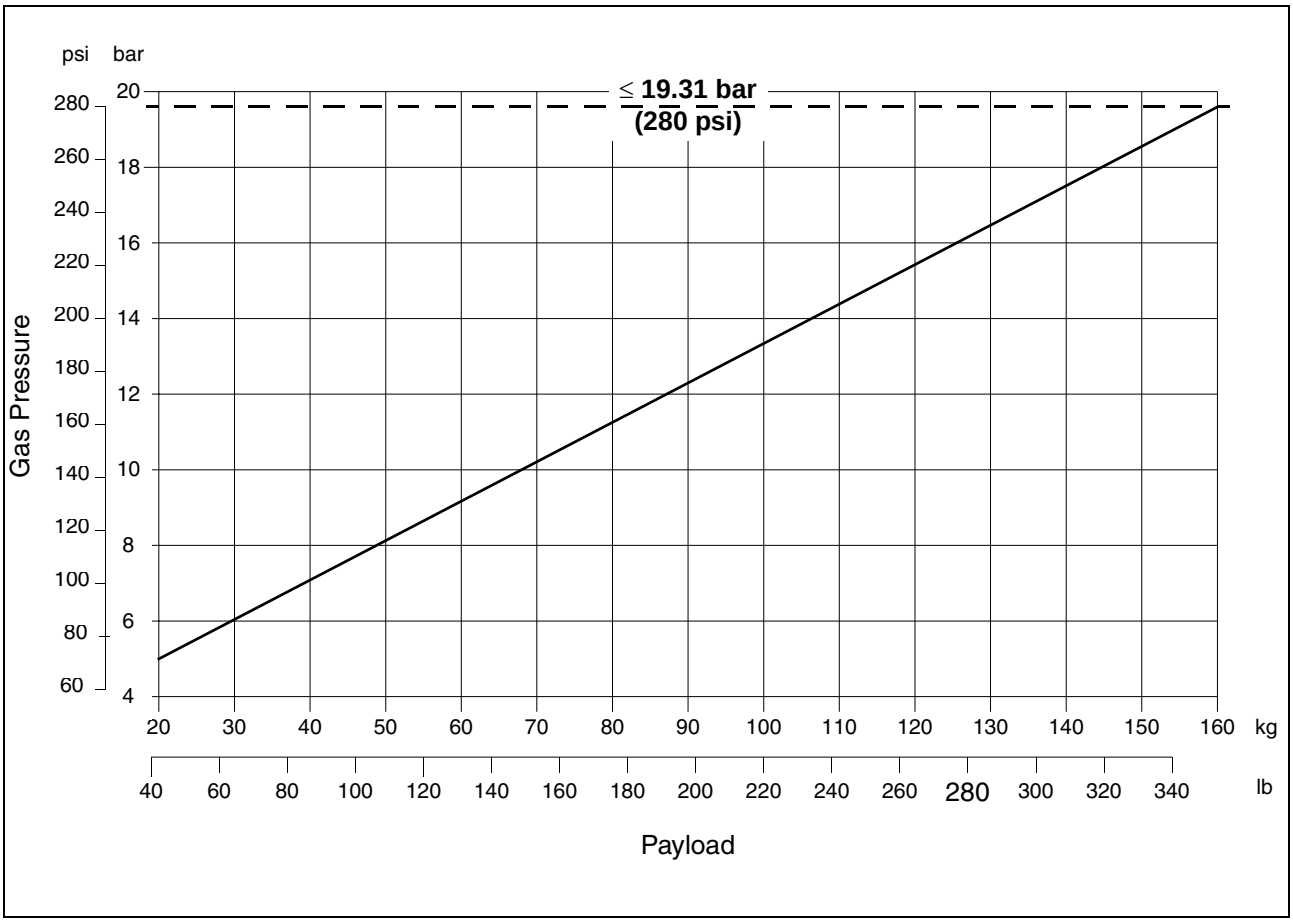


**Fig 2.1 Pressurization graph**

## Nitrogen charging procedure

**WARNING!: A pressure reducing valve must be fitted to the pressure line between the nitrogen cylinder and the outlet connection of the hose. The reducing valve must be screwed into the nitrogen cylinder outlet. the maximum pressure on the outlet side of the reducing valve when charging this pedestal must not exceed 19.31 bar (280 psi).**

9 Charge the pedestal with nitrogen as follows:-

9.1 Connect nitrogen supply to the charging valve (12) on the pedestal, ensuring that the conditions of the above caution are observed. A recommended charging kit for this pedestal is the charging valve assembly, Vinten Part No. 3702-32. Note that this piece of equipment is NOT a pressure reducing valve.

9.2 Ascertain known payload to be fitted to pedestal (known payload = pan and tilt head, camera, lens and all ancillary equipment). Referring to the graph (Fig 2.1), mark the payload on the horizontal axis then strike a vertical line from the load figure to the balance line. At the intersecting point strike a horizontal line to the vertical axis of the graph and read off the gas pressure. Charge the pedestal gas tank to this pressure.

9.3 Fit the pan and tilt head to the platform then fit the camera and accessories. A cable clamp (7) is provided on the pedestal base for camera cables.

9.4 Add four of the large trim weights (1) to the weight tray (3) in the platform.

9.5 Set the column brake (6) to OFF and turn the column friction adjuster (5) to minimum.

9.6 Using firm hand pressure raise and lower the steering ring to check that the pedestal balance is approximately correct. As the locking bars (14) are still engaged the steering ring can only be moved up and/or down about 20 mm (3/4 in.) but this is sufficient to check that the balance is approximately correct. Only a small amount of effort should be needed to move the column. If it rises when released, the pressure is too high and if it falls the pressure is too low. If the pressure is incorrect, slowly add or release nitrogen as required until balance is achieved.

9.7 When balance is correct, depress the steering ring and disengage both platform locking bars (14). Gently lift the steering ring. The camera platform should rise. Exercise platform over its full height range at least twice. With platform at its highest position ensure there is no tendency for it to sink, then move platform to mid-position and release. If platform tends to sink, increase nitrogen pressure.

9.8 Remove charging equipment and fit blanking cap to charging valve.

9.9 The column brake (6) on the fixed section of the column is designed only to hold the column at a set height during camera operation.

## Column locking

10 The column can be locked in its lowest position (whether counterbalanced or not) by means of the two locking bars (14). This facility should be used whenever a load is being fitted, or when the pedestal is not in use. The locking bars are attached to the fixed column and both bars can easily be secured by swinging them upwards to the fixing points on the underside of the inner steering ring.

# Operation

## Balancing

11 Temperature changes may affect the balance of the pedestal column. These effects can be neutralized by adding, or removing, trim weights (1).

## Manoeuvring the pedestal.

12 The pedestal is steered by mans of the steering ring (16) which always maintains the same position in relation to the head mounting platform irrespective of column height. When the pedestal is in crab mode, all three wheel units are locked together; the direction of track being indicated by the red indicators (17) fitted to the steering ring. When the pedestal is in the steer mode two wheels are locked in the straight-ahead position and one wheel provides conventional steering. To change steering mode align one of the red indicators on the steering ring with the datum line on the weight tray (3) and depress the appropriate button.

## Column brake

13 The column, when balanced, may be locked in any position by applying the friction brake (6). The brake is located on the fixed part of the column assembly and is operated by a small lever. The friction brake will not support an out-of-balance load greater than 9.0 kg (20 lb). DO NOT use the friction brake to hold the column when fitting or removing equipment – ALWAYS engage the locking bars.

## Friction control

14 The friction control (5) is located on the fixed part of the column assembly. Friction, or drag, may be applied to the movement of the column to suit the requirements of the operator. Adjustment is by turning the friction control knob, clockwise to increase friction, counter-clockwise to decrease friction.

## Cable guard

15 A drop-down cable guard (10) is fitted to the pedestal base. The guard may be adjusted by slackening the six retaining thumbscrews (11), positioning the guard at the required height and then re-tightening the thumbscrews. The guard should be set as close as possible to the studio floor.

Section 3

# Tools and Materials

## Special tools

1 The following special tools are required for certain procedures detailed in Sections 4 and 5

| Item | Part No. | Use |
|---|---|---|
| Charging valve assembly | 3702-32 | Nitrogen charging |

## Consumable materials

2 The following consumable materials are required for certain procedures detailed in Sections 4 and 5.

| Item | Part No. | Use |
|---|---|---|
| Oil, Nycolube 11B | Z150-031 | Bearing and general lubrication |
| Grease, GP50 | Z150-081 | Crab/steer changeover mechanism |
| Grease, Chesterton | Z150-105 | Ram lubrication |
| Loctite 221 | Z002-026 | Steering change-over gear |
| Loctite 542 | Z002-025 | Pressure gauge assembly |
| Loctite Primer T | Z002-019 | Primer for 542 |
| Lubricant, chain | Z150-050 | Steering chains |
| Soap solution | -- | Leak testing |

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Column Brake . . . . . 15

## General

1 The design of the pedestal and its robust construction ensure that the amount of maintenance required is minimal. Attention to the following points will ensure a long and useful life with minimum need for repair. Should servicing or repair involving disassembly be required, refer to Section 5 - Repair.

## Cleaning

2 During normal studio use, the only cleaning required should be a regular wipe over with a lint-free cloth. Dirt accumulated during storage or periods of disuse may be removed with a semi-stiff brush. Particular attention should be paid to the bearing tracks on the telescopic column.

**NOTE: Do NOT use oil or grease on any exposed part of the telescopic column. This is unnecessary and traps dirt which acts as an abrasive. Use only detergent-based cleaners. Do NOT use solvent- or oil-based cleaners, abrasives or wire brushes to remove accumulations of dirt, as these damage the protective surfaces.**

# Servicing

## Nitrogen charging

3 The pneumatic system of the pedestal is a closed circuit, and normally maintains a given pressure for a long period. However, the charge pressure may need to be varied for load changes in which case, the nitrogen charging procedure given in Section 2 must be followed.

**WARNING!: This pedestal must be charged only with clean dry air or nitrogen. A pressure reducing valve must be fitted to the pressure line between the nitrogen cylinder and the outlet connection of the hose. The reducing valve must be screwed into the nitrogen cylinder outlet. The maximum pressure on the outlet side of the reducing valve when charging this pedestal must not exceed 280psi (19.31bar).**

## Leak check

**NOTE: It is recommended that this check is only carried out when it is apparent that a pressure loss has taken place. To carry out the check it is necessary that the column be at full extension.**

4 Carry out the leak check as follows:

4.1 Place a suitable load (approximating to normal payload) on the head mounting platform, disengage the two platform locking bars and raise the column to its full extent.

4.2 Remove load from head mounting platform.

4.3 Lay the pedestal on its side so that the steering ring supports the column.

4.4 Apply a soap and water solution to the manifold block, the area at the base of the ram, the safety valve and the charging valve. The appearance of bubbles indicates leaks.

4.5 If leaks are apparent, consult Section 5 for the appropriate remedial action.

## Safety valve check.

5 It is suggested that this check be carried out at yearly intervals. Proceed as follows:

5.1 Fit nitrogen charging equipment (Part No. 3702-32) or similar to charging point and depressurize pedestal completely.

5.2 Referring to Fig 6.6, remove safety valve (2) and bonded seal (1) from tank. Remove nitrogen charging equipment from charging point.

5.3 Connect nitrogen charging equipment to nitrogen supply ensuring that a suitable pressure reduction valve is fitted between the gas cylinder and the supply point (Para 3).

5.4 Connect pressure relief valve to outlet side of charging equipment.

5.5 Set pressure reduction valve to 280psi (19.31bar) and pressurize line, increasing pressure in steps of 5psi (0.34bar) until relief valve opens. The valve should operate at 308psi (21.24bar) However,

a tolerance of ± 0.42 bar (6 psi) is permitted, and provided that the valve opens between 20.82 bar and 21.65 bar (302 psi and 314 psi) it can be considered that it is functioning correctly.

**WARNING!: If valve setting is not satisfactory renew the complete valve assembly. DO NOT, under any circumstances, attempt to adjust the valve.**

5.6 Fit new, or refit correctly functioning safety valve to tank, using a new bonded seal (1). The bonded seal should be fitted onto the threaded portion of the valve. Torque tighten the safety valve to 20lbf ft.

5.7 Charge pedestal as described in Section 2.

## Chain tension.

6 Check the chain tension as follows (Fig 4.1):

6.1 Remove cable guard and covers.

6.2 Check the tension of the steering chain. This should be such that there is little or no deflection of the chain on the side opposite the adjuster. If unsatisfactory, adjust as Para 10.

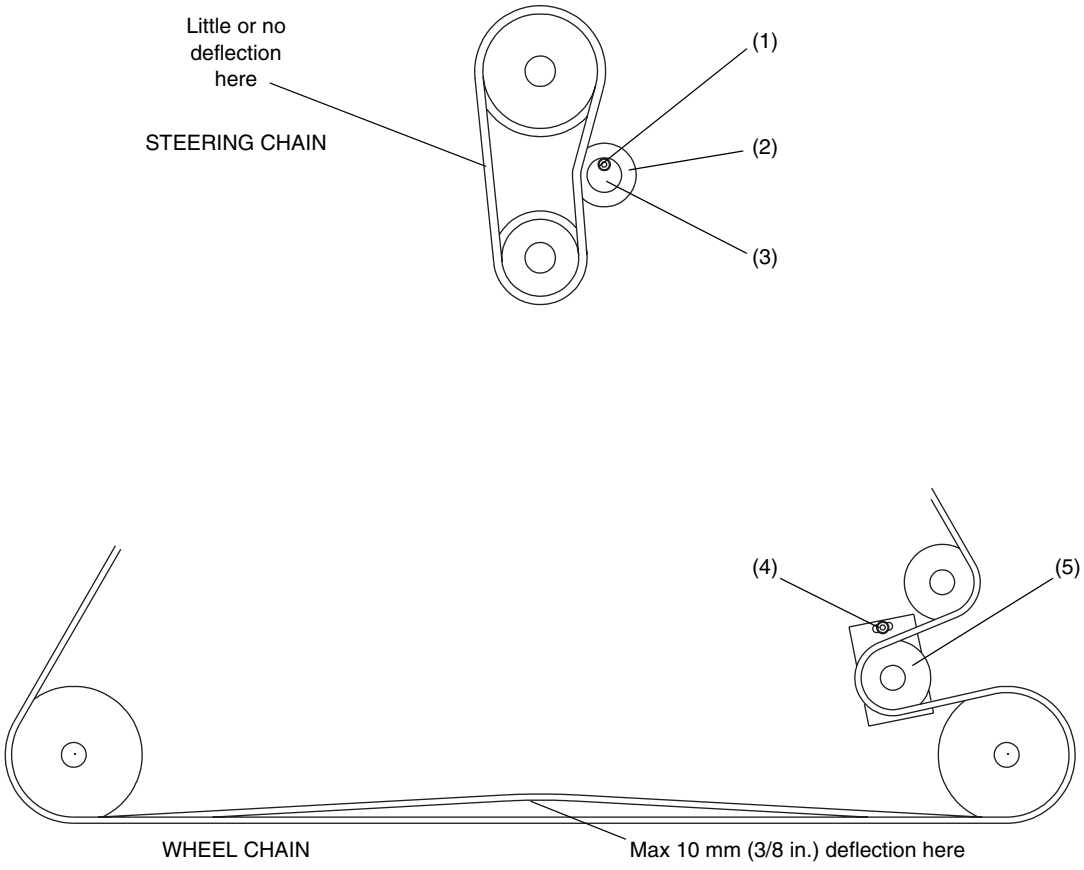


**Fig 4.1 Chain tension adjustment**

6.3 Check the tension of the wheel chain by selecting the greatest length of unsupported chain and measuring the amount of slack. This should not exceed 10 mm (3/8in.). If unsatisfactory, adjust as in Para 11.

6.4 Refit cable guard and covers.

## Wheel tracking

7 Adjustment of wheel tracking is usually necessary only if a chain has stretched or the chain tension has been adjusted. Check the wheel tracking as follows:

7.1 Mark a straight line 6 m (20 ft) long on the studio floor or use an existing line.

7.2 Set the pedestal steering to Crab mode and position the pedestal near one end of the floor line with two of the wheels just touching the line and aligned parallel with it.

7.3 Without turning the steering wheel, push the pedestal the whole length of the line and back again. Note the distance the wheels have run away from or onto the line.

7.4 If the wheels run more than 50 mm (2in.) off the line, the tracking requires adjustment (Para 12).

7.5 Repeat the test for the two remaining pairs of wheels.

## Lubrication

### Steering chains and bearings

8 Lubricate the steering chains and bearings as follows:

8.1 Remove cable guard and covers.

8.2 Clean chains.

8.3 Using a cloth impregnated with chain lubricant, wipe over complete run of each chain.

8.4 Apply Nycolube 11B oil direct to bearing at the lower end of the steering shaft.

8.5 Apply Nycolube 11B oil direct to bearing under head mounting platform.

8.6 Refit cable guard and covers.

### Change-over gear

9 Lubricate the change-over gear as follows:

9.1 Remove cable guard and covers.

9.2 Apply GP50 grease to the pinions of the change-over gear.

9.3 Apply a few drops of Nycolube 11B oil to centre of the change-over spindle.

9.4 Refit cable guard and covers.

**NOTE: The column bearing tracks do not require any lubricant.**

# Adjustments

## Chain tensioning

10 To retension steering chain (Fig 4.1):

10.1 Slacken the shaft bolt (1) on the adjustable sprocket(2) and rotate the eccentric shaft (3) using a tommy bar, until little or no deflection of the chain is possible.

10.2 Retighten the bolt (1).

11 To retension wheel chain (Fig 4.1):

11.1 Slacken the bolt (4) under the adjustable sprocket (5) and reposition block until the slack on the longest free length is 10 mm (3/8in.).

11.2 Retighten the bolt (4).

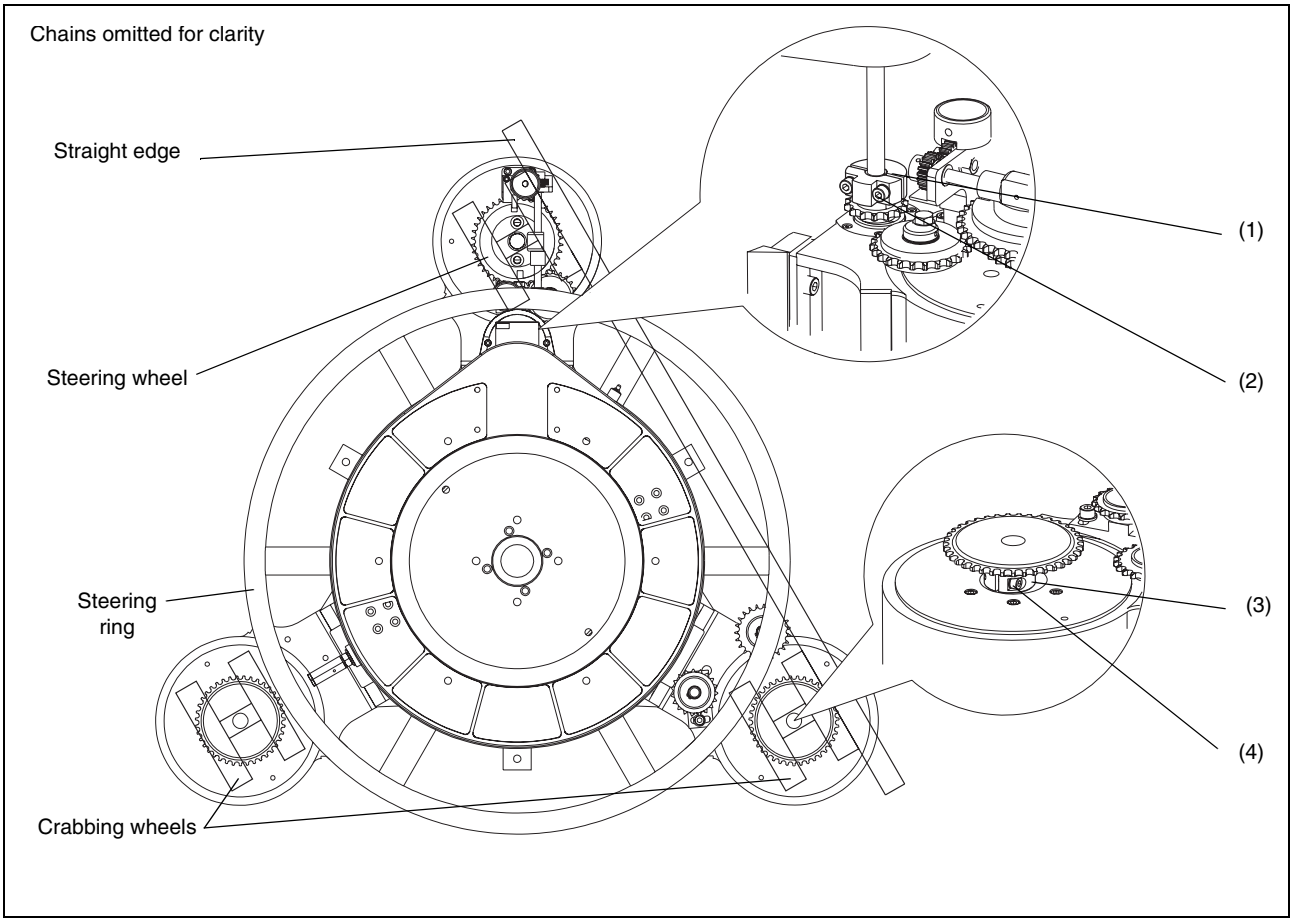


**Fig 4.2 Wheel alignment**

## Wheel alignment

12 After steering chain tensioning it may be necessary to re-align the wheel assembly. The procedure is as follows (Fig 4.2):

12.1 Remove cable guard and covers.

12.2 Set change-over gear to CRAB

12.3 Ensure that, with indicator on steering ring aligned with mark on steering wheel assembly, the steering wheels are set straight ahead. If not, slacken socket screws (2) on clamp block (1), adjust as necessary and retighten clamp block screws (2).

12.4 Slacken the socket screw (4) on the clamp (3) on one of the pairs of crabbing wheels. Set a straight edge against the steering wheels and the crabbing wheels using the outer face of each pair as the datum. Turn the steering ring until the straight edge is flush along wheel faces of steering and crabbing wheels. Retighten clamp screw (4).

12.5 Repeat Para 12.4 for other pair of crabbing wheels.

12.6 Refit cable guard and covers.

## Column guide roller adjustment

13 To adjust the column guide rollers, proceed as follows (Fig 4.3):

13.1 Remove any load from head mounting platform.

13.2 Using nitrogen charging equipment depressurize pedestal to 3.45 bar (50 psi).

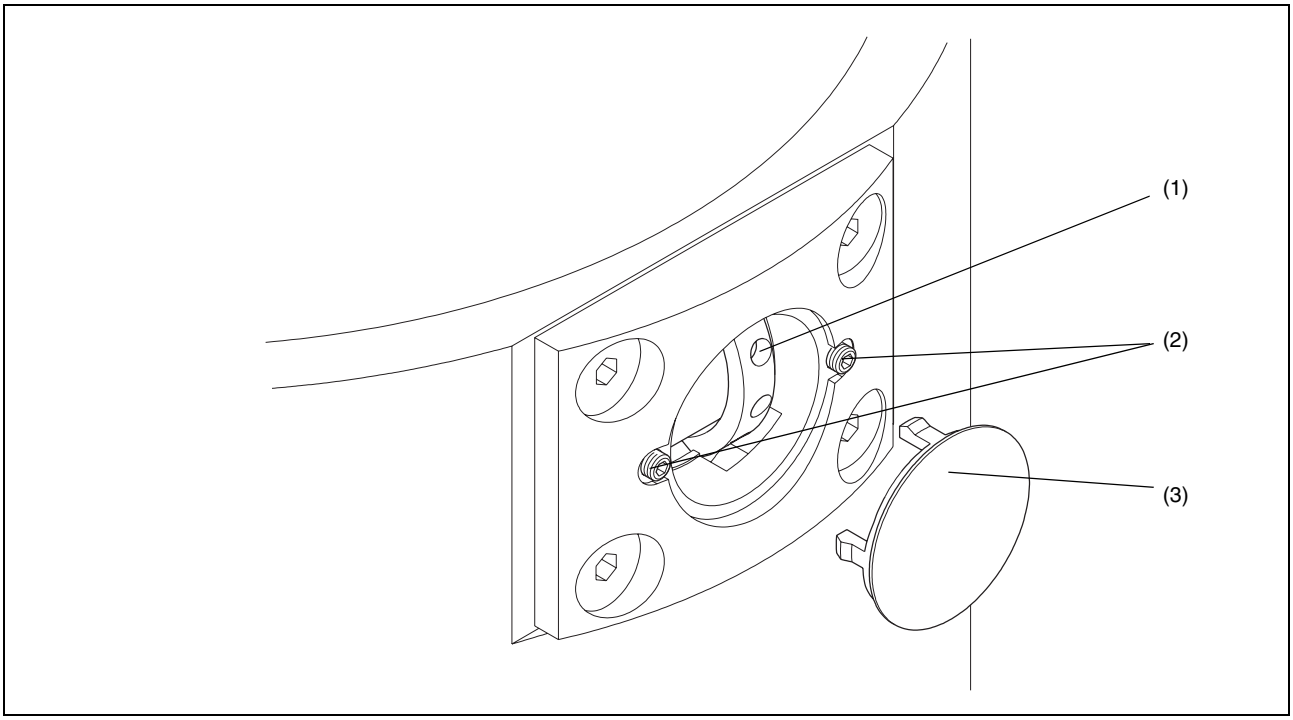


**Fig 4.3 Column guide roller adjustment**

13.3 Lower head mounting platform to a position that will just permit access to guide rollers.

13.4 At one of the pairs of adjustable guide rollers on the centre tube, remove the plugs (3) and slacken two grub screws (2) on both bearings.

13.5 Commencing with the lower of the pair of bearings, adjust each quadrant (1) using a torque wrench and a 50 mm (2 in.) tommy bar to a torque of 1.92N (17 lbf/in.).

13.6 Gently tighten both grub screws (2) until quadrant cannot be moved and refit plugs (3).

13.7 Repeat on adjacent bearing and on bottom and fixed tubes.

13.8 Upon completion of adjustment the column should move smoothly but without any free play between sections.

13.9 Charge pedestal (Section 2).

## Steering ring adjustment

14 The adjustments necessary on the steering ring are limited to maintaining complete freedom of radial movement with all backlash eliminated and to maintain correct tension on the large steering belt, i.e. 6 to 8 lbs pull on outside of spokes. Adjust as follows (Fig 4.4):

14.1 On steering wheel assembly, slacken two locknuts (1).

14.2 Turn studs (2) with screwdriver until required position is reached.

14.3 Tighten locknuts (1).

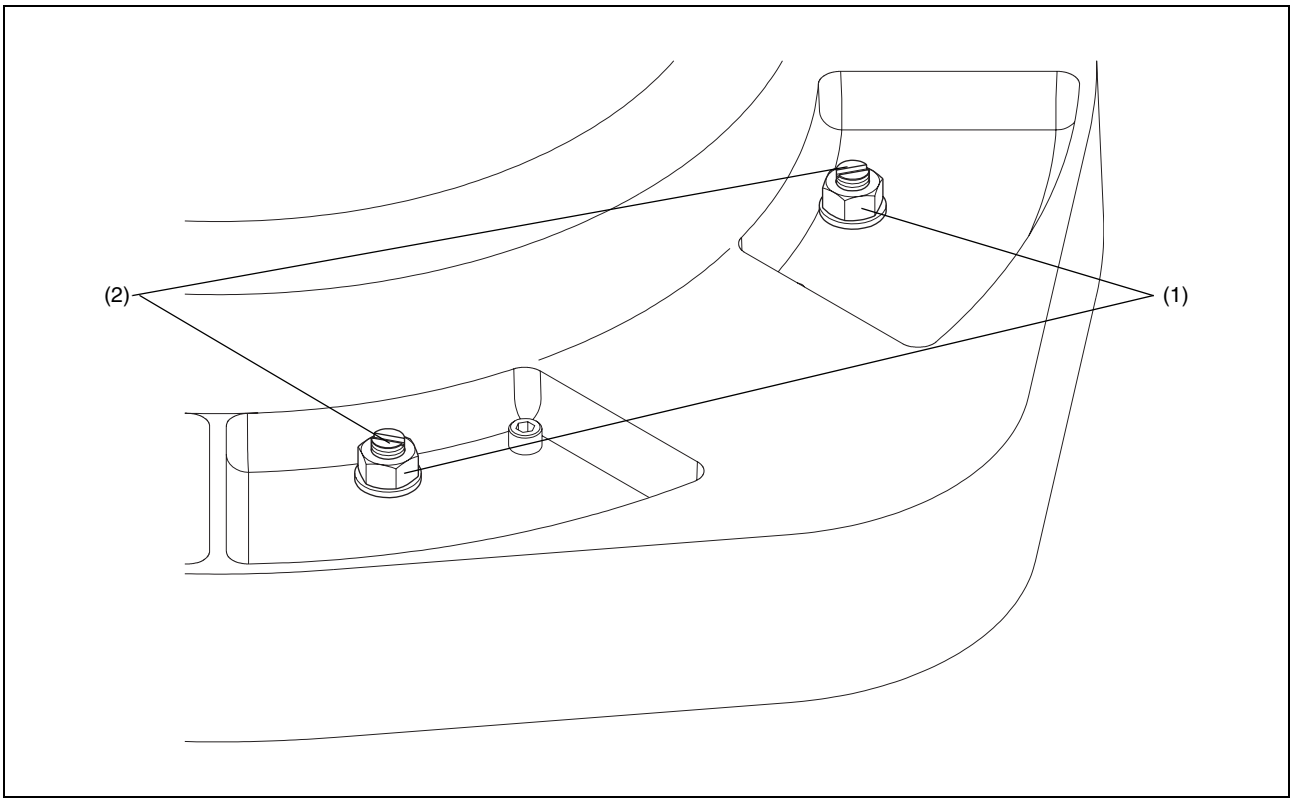


**Fig 4.4 Steering ring adjustment**

## Column Brake

15 To compensate for wear on the brake pad (Fig 6.5 item 27) turn the brake adjuster (33) counter-clockwise until the correct operation is obtained.

## Section 5

# Repair

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## General

1 Repair and renewal of damaged items involves disassembling various assemblies and must be carried out in accordance with the following instructions. Any load must be removed from the pedestal before carrying out the following procedures.

2 Disassembly and assembly of the various components is carried out in conjunction with figures in Section 6 - Illustrated Parts List.

**WARNING!: This pedestal is pressurized to a maximum of 19.31 bar (280 psi). Do not disassemble or interfere with any component in the pressure system without proper authority. Ensure all pressure is vented before disassembling any component in the pressure system.**

**NOTE: Certain consumable materials are required for procedures detailed in this Section. Please refer to Section 3 - Tools and Materials. For further details, please contact Vinten Broadcast Ltd or your local distributor.**

# Disassembly

## Column bearings

3 Each column bearing is secured by four countersunk head socket screws. Ensure bearings are replaced in their correct position. To remove column bearings proceed as follows:

3.1 Extend column to maximum.

3.2 Remove load.

3.3 Connect nitrogen charging equipment to charging point and depressurize pedestal to 50psi (3.45bar).

3.4 Unscrew four countersunk socket screws securing each bearing and remove bearing assembly complete.

3.5 At this point, any defective part of the bearing assembly can be replaced, in particular the grub screws.

3.6 Lubricate bearing with 2 or 3 drops of Nycolube 11B oil through hole in centre of outer race.

3.7 Examine socket headed screws, in particular the hexagon socket. Discard any damaged items.

## Steering assembly

4 To remove the steering assembly (Fig 6.9):

**NOTE: All spring pins and circlips removed should be discarded and new items fitted.**

4.1 Extend column to maximum.

4.2 Remove cover from change-over gear.

4.3 Remove pin (61) by gently tapping with a fine punch at one end, sufficiently to allow a pair of pliers to grip the opposite end, and withdraw and discard pin. Note the relative position of shaft and coupling and make suitable marks on both.

4.4 Ensure upper steering shaft is clear of coupling (1). Remove washer (2) from shaft.

4.5 Referring to Fig 6.4, remove cover plate screws (16) and cover plate (15) from column. Remove two screws (23) securing tube bracket (34) to column.

4.6 Referring to Fig 6.9, remove joining link (24) from steering chain (23) and disengage chain from sprocket.

4.7 Remove four screws (10) securing bracket cover (13).

4.8 Remove four screws (44) securing gear bracket (21) to fixed tube. Retain shims (45, 46) and lift bracket upwards until lower shaft is clear of bearing.

4.9 Remove complete assembly clear of pedestal.

## Column and ram

5 To remove the column proceed as follows:

**NOTE: It is not necessary to remove the column assembly from the pedestal or to dismantle the column for access to the ram assembly.**

5.1 Remove any load from the head mounting platform.

5.2 Remove the steering assembly (Para 4).

5.3 Referring to Fig 6.8 remove four screws (6) and remove the weight tray assembly complete.

5.4 Connect nitrogen charging equipment to charging point and completely depressurize pedestal.

5.5 Lay the pedestal on its side.

5.6 Referring to Fig 6.6 slacken the four screws (10) at each end of the manifold (4) to allow the 'O' ring seal (8) to unseat and any residual pressure in the tank to exhaust. Remove screws (10) and washers (9).

5.7 Withdraw the first stage piston (5) and the manifold (4) together from the bore of the first stage cylinder.

5.8 Close the column to its lowest position.

5.9 Slacken two screws (17) and remove the cords (21) from cord clamps (19). Note the arrangement of the cord in the clamp. Withdraw the cords from the bushes (20) and tie the ends together.

5.10 Stand the pedestal on its wheels.

5.11 Referring to Fig 6.5 remove six screws (25) securing the fixed tube assembly to the tank and lift off the column and ram assembly complete.

6 To dismantle the column proceed as follows:

6.1 Referring to Fig 6.7 remove circlip (26) from the first stage cylinder (6) to release it from the ram plate (31).

6.2 Remove eight screws (32), separate the first stage ram plate (31) from the column bottom tube (33).

6.3 Withdraw the second stage cylinder (4), the first stage cylinder (6) and associated parts from the second stage ram plate (34).

6.4 Temporarily refit the first stage ram plate to the bottom tube.

6.5 Referring to Fig 6.5 remove four screws (16) which secure each of the adjustable cord anchor assemblies (26-31) and withdraw the assemblies from the column.

6.6 Disconnect the cords (26) from the adjusters (27) noting the way in which the cords are secured in the adjusters.

**NOTE: Cords which have been disconnected from the adjusters must be replaced with new cords on reassembly.**

6.7 Referring to Fig 6.4 remove two screws (18) securing each of the four top track clamps (19) and remove the clamps.

6.8 Withdraw the bottom tube, complete with the centre tube and the top tube, from the flange end of the fixed tube. Secure the free ends of the tracks to the bottom tube.

6.9 Referring to Fig 6.3 remove four screws (17) which secure the centre tube cover plate (16) and remove the plate.

6.10 Referring to Fig 6.7 remove the screws (32) which have been used to secure the first stage ram plate (31) to the bottom tube (33).

6.11 Remove joining links (37) to disconnect the chains (38) from the adjusters (28) in the ram plate. Withdraw the cords which pass through the plate.

6.12 Referring to Fig 6.4 remove two screws (25) which secure each of the bottom pulley shafts (26) to the bottom tube and remove the pulley assemblies. Draw the ends of the cords back into the bore of the bottom tube.

6.13 Withdraw the centre tube, complete with the top tube, from the lower end of the bottom tube. Secure the free ends of the tracks to the centre tube.

6.14 Referring to Fig 6.7 remove four screws (32) which secure the second stage ram plate (34) to the centre tube (35).

6.15 Referring to Fig 6.2 remove two screws (2) securing each of the four top track clamps (3) and remove the clamps.

6.16 Withdraw the top tube from the lower end of the centre tube, allowing the chains to run over the sprockets inside the centre tube. Secure the free ends of the tracks to the top tube.

**NOTE: Access to all parts of the column at this point is possible. The replacement procedure for piece parts is self-evident.**

## Ram

7 To remove the ram assembly without removing the column:

**NOTE: The ram assembly consists of a first stage piston inside a first stage cylinder which is, in turn, inside a second stage cylinder.**

7.1 Remove any load from the head mounting platform.

7.2 Connect nitrogen charging equipment to the charging point and completely depressurize the pedestal.

7.3 Lay the pedestal on its side.

7.4 Referring to Fig 6.6 slacken the four screws (10) at each end of the manifold (4) to allow the 'O' ring seal (8) to unseat and any residual pressure in the tank to exhaust. Remove screws (10) and washers (9).

7.5 Withdraw the first stage piston (5) and the manifold (4) together from the bore of the first stage cylinder.

7.6 Close the column to its lowest position.

7.7 Slacken two screws (17) and remove the cords (21) from cord clamps (19). Note the arrangement of the cord in the clamp.

7.8 Referring to Fig 6.7 remove circlip (26) from the end of the first stage cylinder (6) to release it from the ram plate (31).

7.9 Remove eight screws (32), separate the first stage ram plate (31) from the column bottom tube (33) and allow it to hang on the chains.

7.10 The second stage cylinder (4) and the first stage cylinder (6) may now be withdrawn from the second stage ram plate (34).

7.11 Service the ram assembly as necessary. Referring to Fig 6.7, fit new 'O' ring seals throughout. Pack between bearings and coat walls of piston and cylinders with Chesterton white grease No. 622 (Section 3).

## Safety valve, charging valve and pressure gauge

8 To replace a defective safety valve, charging valve or pressure gauge proceed as follows:

8.1 Connect nitrogen charging equipment to the charging point and completely depressurize the pedestal.

8.2 Remove the defective item and replace with new or serviceable item. Fit new bonded seals.

8.3 Charge the pedestal (Section 2).

8.4 In the case of safety valve replacement refer to Section 4.

8.5 Carry out leak check (Section 4).

# Assembly

## Column and ram

9 The arrangement of cords and chains within the column assembly is shown diagrammatically in Fig 5.1.

10 To assemble the column and ram:

10.1 Referring to Fig 6.2, assemble top tube except for top track clamps (3).

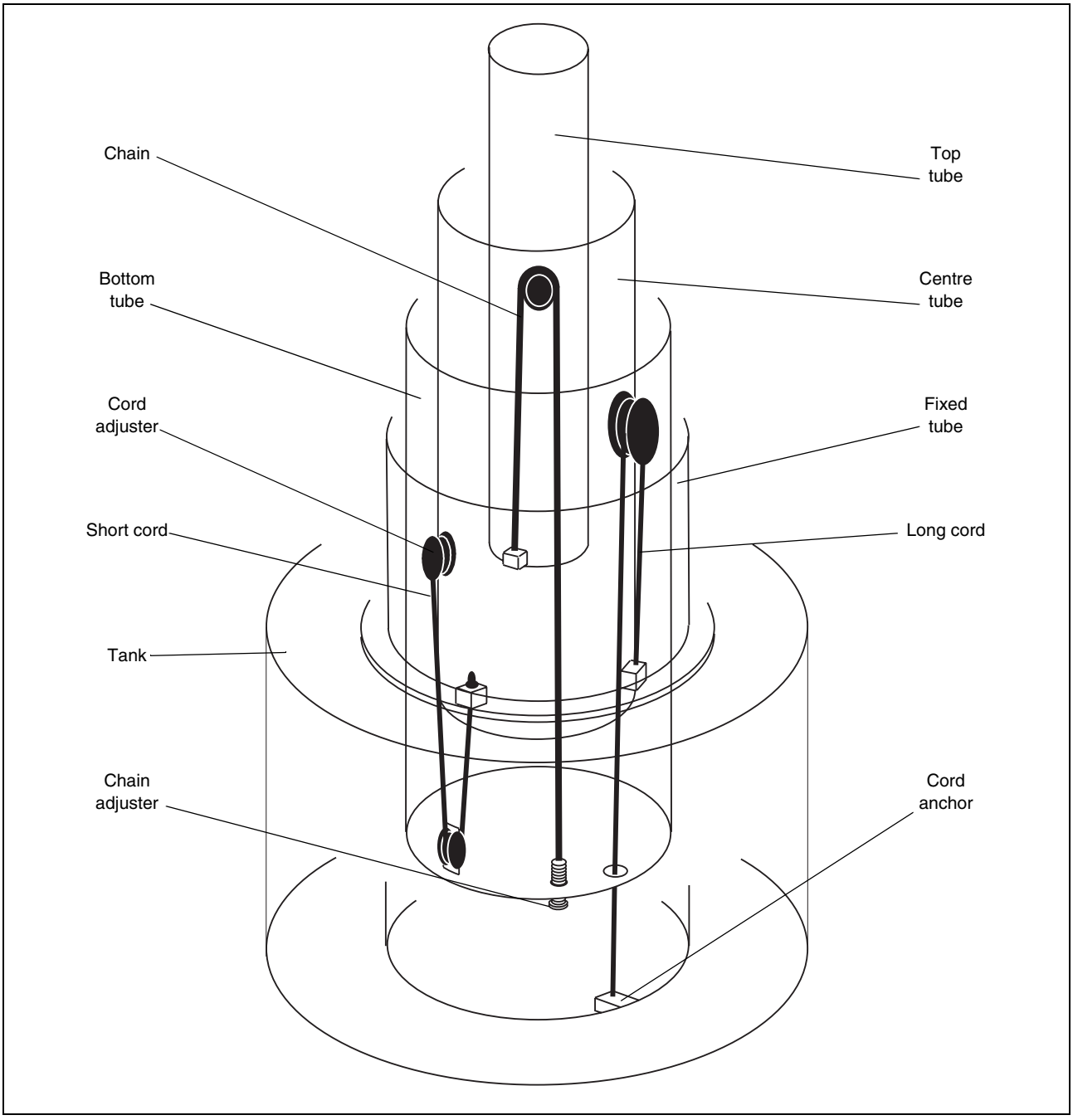


**Fig 5.1 Arrangement of cords and chains in the column**

10.2 Attach chains (10) to top tube anchor brackets (8) noting that anchor pins (6) are available in different lengths.

10.3 Referring to Fig 6.3, assemble centre tube completely except for top track clamps (26) and cover (16).

10.4 Fully back off four adjustable rollers on centre tube.

10.5 Insert top tube into lower end of centre tube, making sure that stop lugs on top tube will engage with stops fitted in centre tube. Leave chains trailing out of lower end of centre tube.

10.6 Adjust rollers on centre tube (Section 2).

10.7 Referring to Fig 6.3, lead chains (15) up through centre tube, over sprockets (14) and down through centre tube.

10.8 Referring to Fig 6.7, feed free ends of chains through the holes in second stage ram plate (34) and secure ram plate to centre tube with four screws (32).

10.9 Referring to Fig 6.2 secure four top track clamps (3) to top tube (1) with screws (2).

10.10 Referring to Fig 6.3 fit long cords (32) and short cords (34) to centre tube (31), ensuring that the cords lead correctly from the attachment lugs on the tube.

10.11 Referring to Fig 6.4 assemble bottom tube complete except for top track clamps (19), tube bracket (34), cover (15) and lower pulleys (26-29).

10.12 Fully back off four adjustable rollers on bottom tube.

10.13 Referring to Fig 6.4, lead long cords (Fig 6.3 item 32) round top pulleys (11) inside bottom tube and out through lower end of bottom tube. Ensure that cords pass between pulley and Spirol pin (21) on each side of pulley.

10.14 Insert centre tube assembly into lower end of bottom tube, making sure that stop lugs on centre tube will engage with stops fitted in bottom tube. Check that long cords lead correctly.

10.15 Adjust rollers on bottom tube (Section 4).

10.16 Referring to Fig 6.3 fit top track clamps (26) to centre tube.

10.17 Referring to Fig 6.4 feed short cords out through slots for lower pulleys (26-29) in bottom tube.

10.18 Referring to Fig 6.7 fit chain adjusters (28 - 30) to first stage ram plate and connect chains using links (37), making sure that rubber sleeve (36) is fitted on each chain.

10.19 Referring to Fig 6.3 feed free ends of long cords (32) through holes in ram plate.

10.20 Referring to Fig 6.7, temporarily secure first stage ram plate (31) to bottom tube (33) using two screws (32).

10.21 Referring to Fig 6.4, fit lower pulleys (26-29), ensuring that short cords pass between pulley and lower edge of pulley slot.

10.22 Referring to Fig 6.5, assemble fixed tube complete except for cord adjuster assemblies (27 - 31), friction assembly (19 - 23) and brake assembly (34 - 41).

10.23 Fully back off four adjustable rollers on fixed tube.

10.24 Insert bottom tube assembly into lower end of fixed tube, making sure that stop lugs on bottom tube will engage with stops fitted in fixed tube.

10.25 Adjust rollers on fixed tube (Section 4).

10.26 Referring to Fig 6.4 fit track top clamps (19) on bottom tube and secure with screws (18).

10.27 Feed short cords out through cord adjuster holes in fixed tube.

10.28 Referring to Fig 6.5 thread cord adjusters (27) onto short cords (26), notched side towards tubes and pull up close to fixed tube.

10.29 Fully extend column, allowing short cords to draw back through adjusters.

10.30 Mark the free end of each short cord at the point where it emerges from the adjuster.

10.31 Collapse the column and make a crown knot with a single round of back splicing in short cord at the marked position. Trim and heat-seal ends of strands close to splice.

10.32 Draw short cords through adjusters to seat crown knot in bore of adjuster, assemble adjuster components (27- 31) and secure to fixed tube using screws (16).

10.33 Referring to Fig 6.5, fit friction assembly (19 - 23) and brake assembly (34 - 41) to fixed tube using screws (14) and (32) respectively.

10.34 Referring to Fig 6.7 fit circlip (40) to second stage cylinder (4). Install lock ring (39) above circlip, ensuring that recess faces circlip. Secure ring to circlip using plate (21) and screw (22) with Loctite 221.

10.35 Fit circlip (13) to upper groove in first stage cylinder (6).

10.36 Assemble second stage cylinder (4) to first stage cylinder (6), after servicing cylinder and piston sub-assemblies (Para 7.11)

10.37 Remove first stage ram plate (31), but do not disconnect chains or unthread cords from ram plate.

10.38 Install second stage cylinder and first stage cylinder assembly into second stage ram plate (34).

10.39 Install lock ring (27) on exposed part of first stage cylinder (6) to abut circlip (13), ensuring that recess faces circlip.

10.40 Fit first stage ram plate (31) onto first stage cylinder and secure with circlip (26).

10.41 Refit first stage ram plate to bottom tube (33) using eight screws (32).

11 To install the column and ram proceed as follows:

11.1 Referring to Fig 6.5, install the complete column assembly on the base ensuring that the facing flats on the support column are matched with the corresponding flats on the tank. Secure with six screws (25).

11.2 Lay pedestal on its side with flat on fixed tube uppermost. Use wooden blocks to support the unit in this position. Referring to Fig 6.6, thread cords (21) down through bushes (20).

11.3 Referring to Fig 6.7, assemble first stage piston, fit new 'O' ring seal (24) and secure to manifold (25) with three screws (23). Do not tighten screws at this stage.

11.4 Referring to Fig 6.6, install assembled piston and manifold to tank, ensuring that a new 'O' ring seal (8) is fitted and secure with eight screws (10) and washers (9). Do not tighten screws at this stage.

**WARNING!: This pedestal must be charged only with clean dry air or nitrogen. A pressure reducing valve must be fitted to the pressure line between the nitrogen cylinder and the outlet connection of the hose. The reducing valve must be screwed into the nitrogen cylinder outlet. The maximum pressure on the outlet side of the reducing valve when charging this pedestal must not exceed 280psi (19.31bar)**

11.5 Connect nitrogen supply to the charging point on the pedestal. A recommended charging kit for this pedestal is the charging valve assembly, Vinten Part No. 3702-32. Note that this piece of equipment is NOT a pressure reducing valve.

11.6 Apply nitrogen pressure slowly and use only sufficient to cause the column to extend to its full extent. Do not exceed 50psi (3.45bar). Maintain tension in cords as column extends.

11.7 When column is fully extended pull cords taut, secure ends of cords as noted in Para 5.9 and secure using clamp (19) and screw (17).

11.8 Referring to Fig 6.7, tighten nuts (30) on chain adjusters (28) to remove all perceptible slack from chains and lock with locknuts (29).

11.9 Return pedestal to upright position.

11.10 Referring to Fig 6.5, use a screwdriver to turn cord adjusters (27) clockwise to take up slack in cords and lock adjustment by tightening nuts (30).

11.11 Referring to Fig 6.4, place cover (15) on column. Do not insert screws (16) at this stage.

11.12 Referring to Fig 6.3, install cover (17) and insert four screws (17). Do not tighten screws at this stage.

11.13 Referring to Fig 6.8, install weight tray assembly and secure with four screws (6). Do not tighten screws at this stage.

11.14 Slightly tilt pedestal using a wooden block under one wheel bracket to give access to screws in manifold.

11.15 Place a mass of about 11 kg (24 lb) on the weight tray and fully compress the column to centralize the ram components.

11.16 Referring to Fig 6.6, tighten screws in manifold commencing with the three screws holding the ram to the manifold (7), followed by the eight screws holding the manifold to the tank (10).

11.17 Exercise the column by raising and lowering to full extent at least twice, ensuring that smooth action is available over the complete range.

11.18 If sticking is noted slacken off then retighten screws in manifold. Repeat until smooth action is available over the complete range.

11.19 Allow column to rise to its full extent and remove mass from weight tray.

11.20 Fit steering assembly (Para 14).

11.21 Place a mass of about 11 kg (24 lb) on the weight tray and fully compress the column to centralise the steering assembly in the weight tray.

11.22 Allow column to rise to its full extent and remove mass from weight tray.

11.23 Referring to Fig 6.8, tighten four screws (6) to secure weight tray.

11.24 Referring to Fig 6.3, tighten four screws (17) on cover (16).

11.25 Charge pedestal to working pressure (Section 2).

11.26 Carry out leak check (Section 4)

## Ram

12 To assemble the ram:

12.1 Referring to Fig 6.7 fit circlip (40) to second stage cylinder (4). Install lock ring (39) above circlip, ensuring that recess faces circlip. Secure ring to circlip using plate (21) and screw (22) with Loctite 221.

12.2 Fit circlip (13) to upper groove in first stage cylinder (6).

12.3 Assemble second stage cylinder (4) to first stage cylinder (6), after servicing cylinder and piston sub-assemblies (Para 7.11).

13 To install the ram:

13.1 Remove first stage ram plate (31), but do not disconnect chains or unthread cords from ram plate.

13.2 Install second stage cylinder and first stage cylinder assembly into second stage ram plate (34).

13.3 Install lock ring (27) on exposed part of first stage cylinder (6) to abut circlip (13), ensuring that recess faces circlip.

13.4 Fit first stage ram plate (31) onto first stage cylinder (6) and secure with circlip (26).

13.5 Secure first stage ram plate to column bottom tube (33) using eight screws (32).

13.6 Referring to Fig 6.7, assemble first stage piston, fit new 'O' ring seal (24) and secure ram to manifold (25) with three screws (23). Do not tighten screws at this stage.

13.7 Referring to Fig 6.6, install assembled piston and manifold to tank, ensuring that a new 'O' ring seal (8) is fitted and secure with eight screws (10) and washers (9). Do not tighten screws at this stage.

13.8 Thread cords (21) through bushes (20).

13.9 Stand pedestal upright and mount on blocks positioned immediately inboard of the wheels.

**WARNING!: This pedestal must be charged only with clean dry air or nitrogen. A pressure reducing valve must be fitted to the pressure line between the nitrogen cylinder and the outlet connection of the hose. The reducing valve must be screwed into the nitrogen cylinder outlet. The maximum pressure on the outlet side of the reducing valve when charging this pedestal must not exceed 280psi (19.31bar)**

13.10 Connect nitrogen supply to the charging point on the pedestal. A recommended charging kit for this pedestal is the charging valve assembly, Vinten Part No. 3702-32. Note that this piece of equipment is NOT a pressure reducing valve.

13.11 Apply nitrogen pressure slowly and use only sufficient to cause the column to extend to its full extent. Do not exceed 50psi (3.45bar). Maintain tension in cords as column extends.

13.12 When column is fully extended pull cords taut, secure ends of cords as noted in Para 5.9 and secure using clamp (19) and screw (17).

13.13 Adjust bearings in column (Section 4).

13.14 Exercise the column by raising and lowering to full extent at least twice, ensuring that smooth action is available over the complete range.

13.15 Referring to Fig 6.6, tighten screws in manifold commencing with the three screws holding the ram to the manifold (7), followed by the eight screws holding the manifold to the tank (10).

13.16 Exercise the column by raising and lowering to full extent at least twice, ensuring that smooth action is available over the complete range.

13.17 Repeat Para 13.14. If sticking is noted slacken off then retighten screws in manifold. Repeat until smooth action is available over the complete range.

13.18 Remove pedestal from blocks.

13.19 Charge pedestal to working pressure (Section 2).

13.20 Carry out leak check (Section 4).

## Steering assembly

14 To install the steering assembly (Fig 6.9):

14.1 Position steering box so as to allow shaft (20) to be inserted into bearing on base.

14.2 Install retained shims (45, 46) and gear bracket (21) and secure to fixed tube with four screws (44).

14.3 Install bracket cover (13) and secure with four screws (10).

14.4 Extend upper drive shaft (3) and install washer (2). Insert shaft in coupling (1), ensuring that the reference marks are aligned and secure with new spring pin (61).

14.5 Referring to Fig 6.4, secure tube bracket (34) to bottom tube with two screws (23). Secure cover plate (15) to column with six screws (16).

14.6 Referring to Fig 6.9, fit steering chain (23) and joining link (24).

14.7 Slacken clamp bolt (26).

14.8 Ascertain wheel position (set of wheels under change-over gear).

14.9 Align steering ring indicators to the wheel position.

14.10 Tighten clamping bolt (26).

14.11 Referring to Fig 6.14, refit change-over gear cover (9).

## Column bearings

15 To install column bearings:

15.1 Before refitting column bearings to a tube set all the adjustable bearings on that tube to minimum setting.

15.2 Fit bearing assembly into place and secure with four countersunk socket headed screws.

15.3 Adjust bearings (Section 4).

# Other replacements

16 All other replacements are simple and the method is self-evident after a brief study of the particular item and the exploded drawing in Section 6. Replacements affecting wheels or steering chains are equally simple but require a check on tracking and chain tensioning (Section 4).

**NOTE: When fitting a crab/steer pin circlip, shim as necessary to allow 1/32in. clearance between circlip and clutch body.**
**If the steering change-over gear (Fig 6.10) has been dismantled, secure items (48) and (50) with Loctite 221 during assembly.**

## Section 6

# Illustrated Parts List

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## Introduction

1 This parts list is issued for the Fulmar pedestal, manufactured by VINTEN BROADCAST LIMITED, Western Way, Bury St. Edmunds, Suffolk, IP33 3TB, England.

## Ordering spare parts

2 Always quote the pedestal serial number.

3 When ordering a spare part, please quote the part number, NOT the item number.

4 Certain items form part of -900SP series composite spare parts. These are detailed in Fig 6.15 and are indicated in the parts list by an asterisk (*).

5 Due to restrictions placed on the transportation of adhesives and other materials, please obtain supplies of consumable materials from your local distributor.

## Main assembly part numbers

6 Ensure that the correct serial and part numbers are quoted when ordering main assemblies.

| Assembly | Part No. |
|---|---|
| Base assembly | 3702-11 |
| Column assembly | 3702-12 |
| Ram assembly | 3702-14 |
| Weight tray assembly | 3702-13 |
| Steering assembly | 3702-24 |
| Wheel housing assembly (steering) | 3702-27 |
| Wheel housing assembly (adjustable sprocket) | 3702-28 |
| Wheel housing assembly (fixed) | 3702-29 |

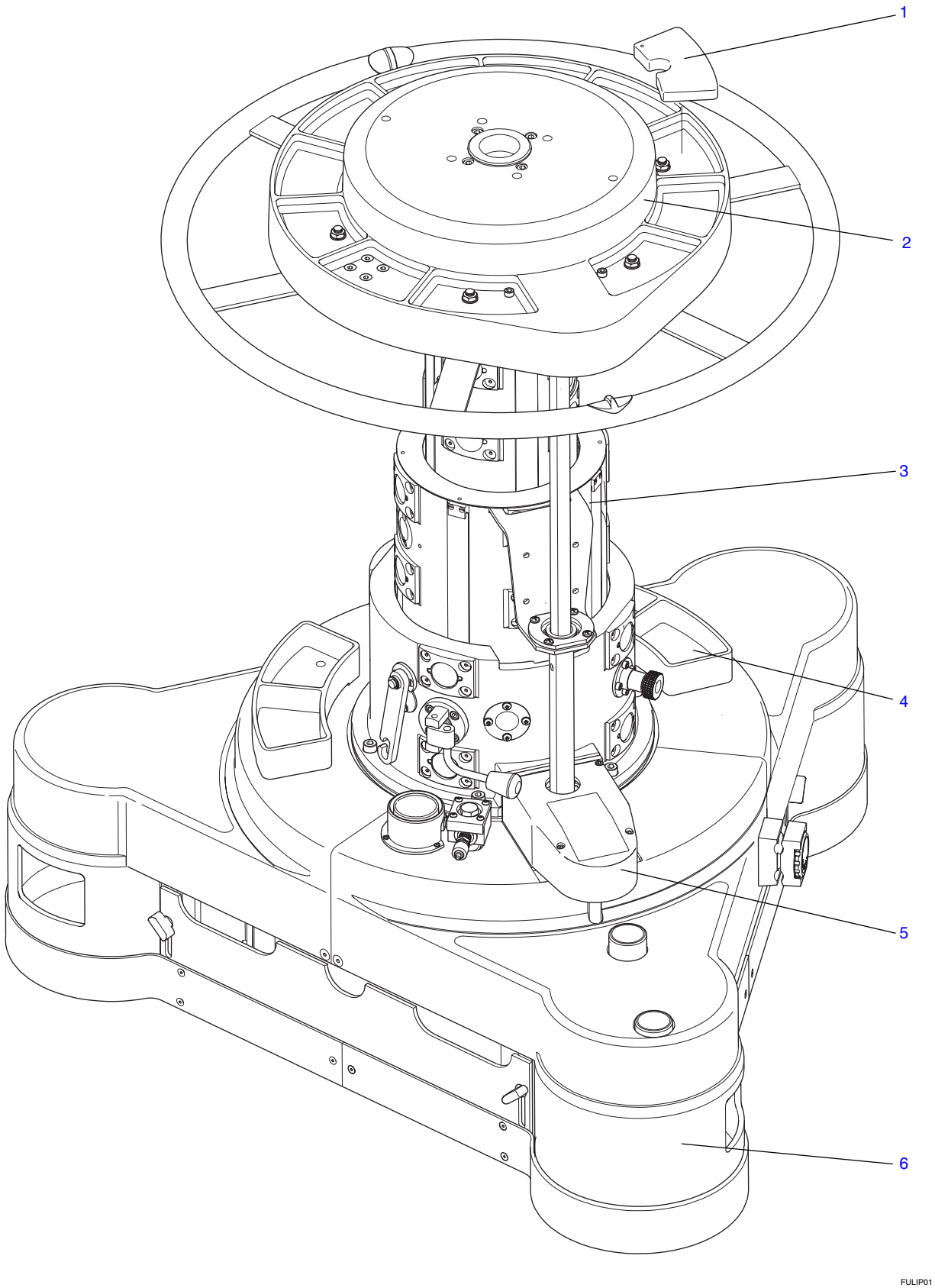


**Fig 6.1 Fulmar Pedestal**

## Fig 6.1 Fulmar Pedestal

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 1 | 3702-335 | Trim weight (large) | 8 |
| 2 | 3702-13 | Weight tray assembly (Fig 6.8) | 1 |
| 3 | 3702-12 | Tube assembly | 1 |
| 4 | 3702-213 | Weight box | 2 |
| 5 | 3702-24 | Steering assembly (Fig 6.9) | 1 |
| 6 | 3702-11 | Base assembly | 1 |

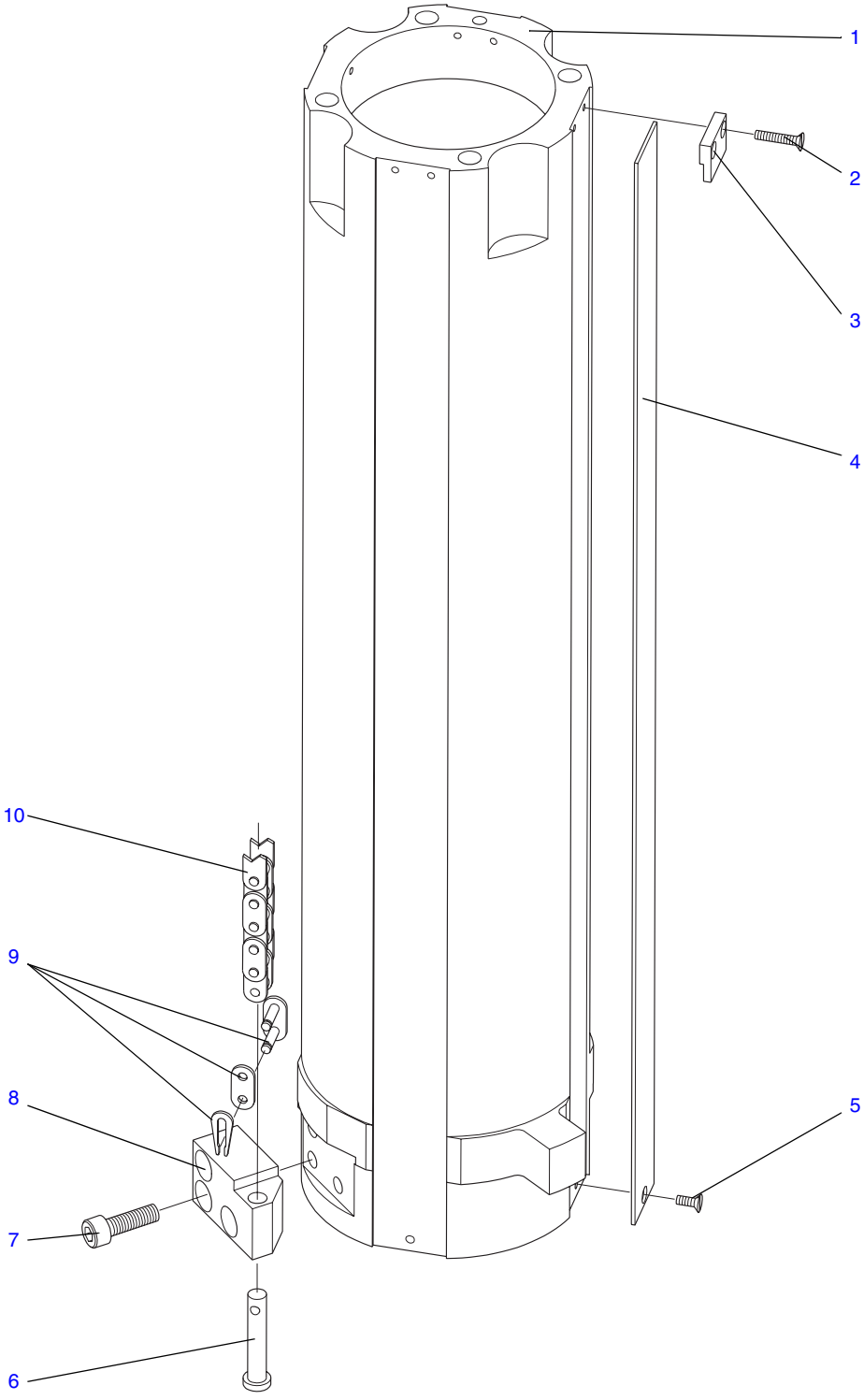


**Fig 6.2 Fulmar Pedestal - Top Tube**

## Fig 6.2 Fulmar Pedestal - Top Tube

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 1 | 3702-205 | Top tube | 1 |
| 2 | L072-005 | Screw, csk, 4-40 in. UNC x 3/4 in. lg | 8 |
| 3 | 3702-234 | Track clamp, top | 4 |
| 4 | 3702-256 | Track. top tube | 4 |
| 5 | L072-035 | Screw, csk, 4-40 in. UNC x 1/4 in. lg | 8 |
| 6 | 3702-249<br>or<br>3702-250 | Anchor pin, chain<br>or<br>Anchor pin, short | 1 |
| 7 | L076-922 | Screw, skt cap hd, 1/4 in. UNC x 3/4 in. lg | 6 |
| 8 | 302-248 | Anchor, chain | 2 |
| 9 | J202-061 | Connecting link, single, 3/8 in. pitch chain | 2 |
| 10 | J202-014 | Roller chain, 3/8 in. pitch, 83 pitches (Fig 6.3) | 2 |

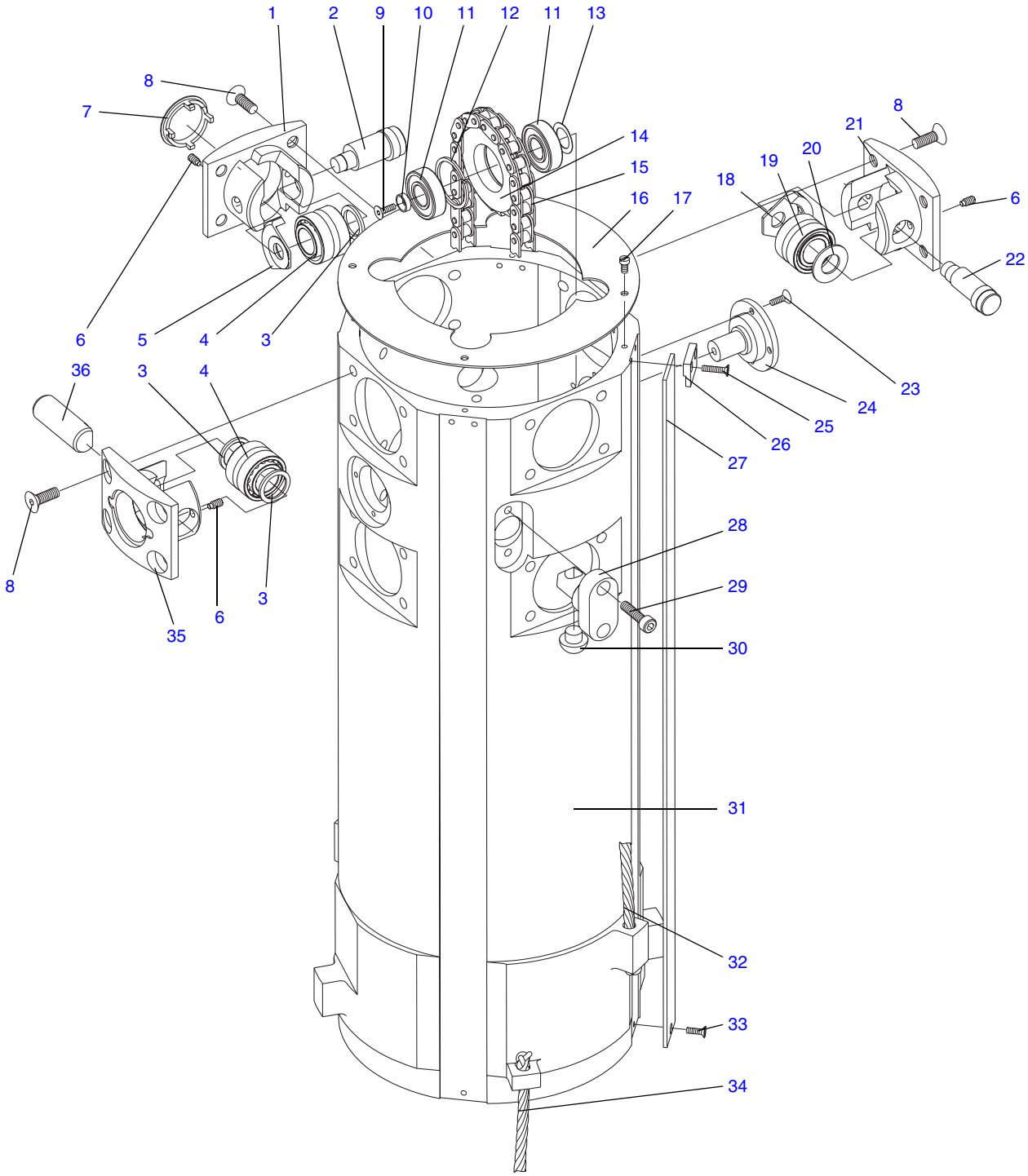


**Fig 6.3 Fulmar Pedestal - Centre Tube**

## Fig 6.3 Fulmar Pedestal - Centre Tube

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| | 3702-36 | Bearing assembly (adjusting), comprising: | 2 |
| 1 | 3702-391 | Bracket roller, adjusting | 1 |
| 2 | 3176-223 | bearing spindle | 1 |
| 3 | 3176-228 | Shim | 1 |
| 4 | P203-006 | Bearing, needle roller, radial, with angular contact ball bearing, 15 mm ID x 28 mm OD x 20 mm long | 1 |
| 5 | 3176-222 | Adjuster, eccentric | 1 |
| 6 | L075-804 | Screw, grub, half dog point, socket head, 10-32UNF x 1/4 in. long | 2 |
| 7 | 3702-356 | Plug, roller bracket | 8 |
| 8 | L076-002 | Screw, skt csk hd, 1/4 in. UNF x 1/2 in. lg | 32 |
| 9 | M005-903 | Screw, skt csk hd, M4 x 12 mm lg | 2 |
| 10 | M600-001 | Washer, GN 184-16 | 2 |
| 11 | P200-201 | Bearing, 6001-22 | 4 |
| 12 | M701-039 | Snap ring, M2300-0280 | 2 |
| 13 | M602-003 | Shim P12-18-0.3 | 8 |
| 14 | 3702-456 | Sprocket, lifting | 2 |
| 15 | J202-014 | Roller chain, 3/8 in. pitch, 83 pitches (Fig 6.7) | 2 |
| 16 | 3702-264 | Cover, centre tube | 1 |
| 17 | L073-407 | Screw, fillister hd, 6-32 in. UNF x 1/4 in. lg | 4 |
| | 3702-37 | Bearing assembly (adjusting), comprising: | 2 |
| 6 | L075-804 | Grub screw, skt hd, 10-32 in. UNF x 1/4 in. lg | 2 |
| 18 | 3702-231 | Adjuster, eccentric | 1 |
| 19 | N500-021 | Bearing, needle roller, NK12/20 | 1 |
| 20 | 3702-372 | Washer, eccentric bearing | 1 |
| 21 | 3702-206 | Bracket roller, adjusting | 1 |
| 22 | 3702-229 | Pin. adjustable | 1 |
| 23 | L073-011 | Screw, csk hd, 6-32 in. UNF x 3/8 in. lg | 8 |
| 24 | 3702-455 | Stub shaft, sprocket | 2 |
| 25 | L072-005 | Screw, csk, 4-40 in. UNC x 3/4 in. lg | 8 |
| 26 | 3702-234 | Track clamp, top | 4 |
| 27 | 3702-257 | Track, centre tube | 4 |
| 28 | 3702-247 | Stop, centre tube | 2 |

## Fig 6.3 Fulmar Pedestal - Centre Tube (Cont)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 29 | L075-917 | Screw, skt cap hd, 10-32 in. UNF x 3/8 in. lg | 4 |
| 30 | J550-001 | Mushroom buffer | 2 |
| 31 | 3702-204 | Centre tube | 1 |
| 32 | 3702-904SP* | 3-strand pre-stretched Terylene cord, 1/4 in. dia x 50 in. lg (Fig 6.6) | 2 |
| 33 | L072-035 | Screw, slotted csk hd, 4-40 in. UNC x 3/8 in. lg | 4 |
| 34 | 3702-903SP* | 3-strand pre-stretched Terylene cord, 1/4 in. dia x 28 in. lg (Fig 6.5) | 2 |
| | 3702-35 | Bearing assembly, comprising: | 4 |
| 3 | 3176-228 | Shim | 2 |
| 4 | P203-005 | Bearing, needle roller, NK1B5902 | 1 |
| 6 | L075-804 | Grub screw, skt hd, 10-32 in. UNF x 1/4 in. lg | 1 |
| 35 | 3702-207 | Bracket roller | 1 |
| 36 | 3704-224 | Shaft | 1 |

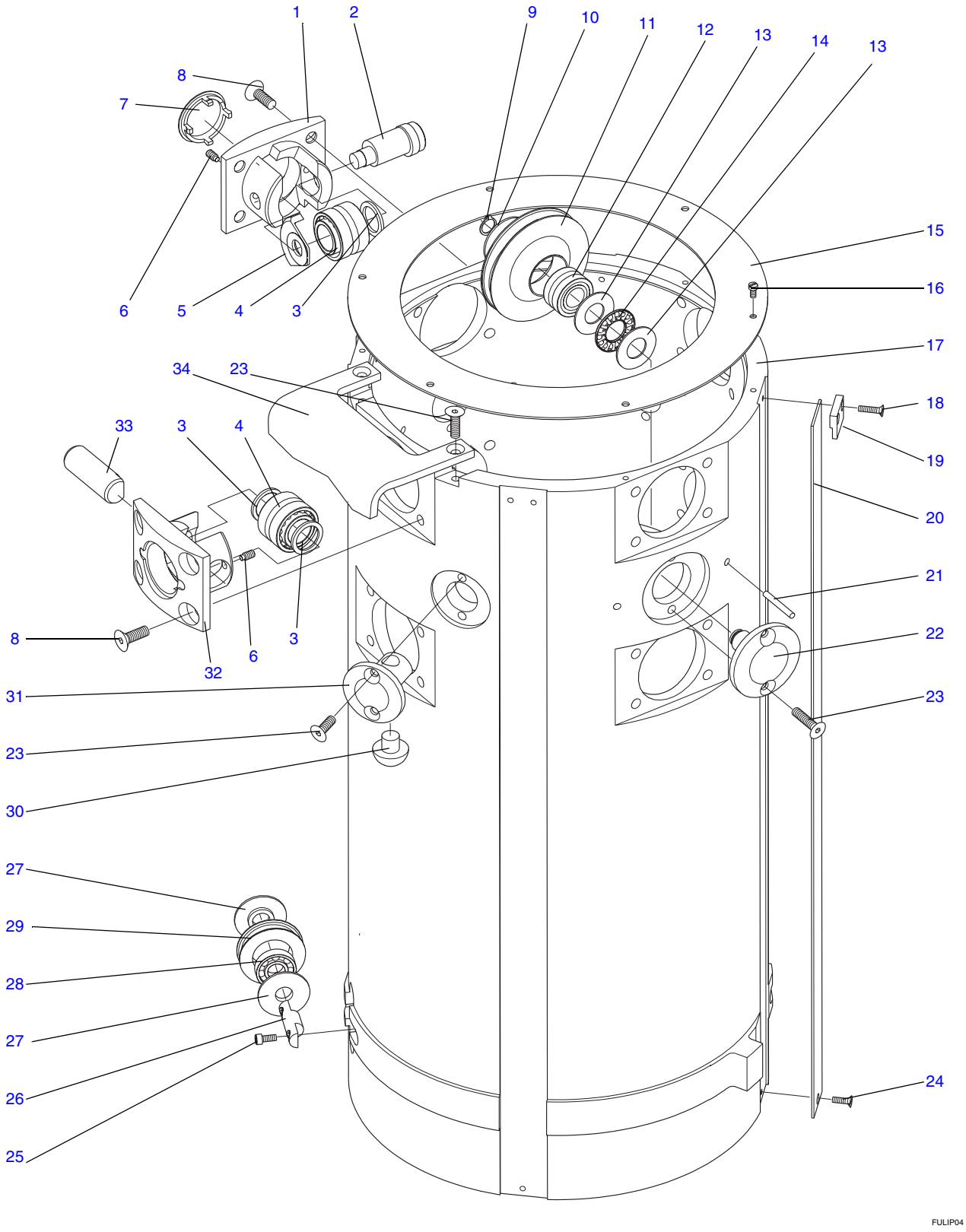


**Fig 6.4 Fulmar Pedestal - Bottom Tube**

## Fig 6.4 Fulmar Pedestal - Bottom Tube

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| | 3702-36 | Bearing assembly (adjusting), comprising: | 2 |
| 1 | 3702-391 | Bracket roller, adjusting | 1 |
| 2 | 3176-223 | bearing spindle | 1 |
| 3 | 3176-228 | Shim | 1 |
| 4 | P203-005 | Bearing, needle roller, NK1B5902 | 1 |
| 5 | 3176-222 | Adjuster, eccentric | 1 |
| 6 | L075-804 | Grub screw, skt hd, 10-32 in. UNF x 1/4 in. lg | 2 |
| 7 | 3702-356 | Plug, roller bracket | 8 |
| 8 | L076-002 | Screw, skt csk hd, 1/4 in. UNF x 1/2 in. lg | 32 |
| 9 | L701-007 | External circlip | 2 |
| 10 | 3702-355 | Washer, retaining | 2 |
| 11 | 3702-254 | Pulley, top | 2 |
| 12 | P601-012 | Needle bearing | 2 |
| 13 | P602-013 | Thrust washer | 4 |
| 14 | P602-012 | Needle thrust cage | 2 |
| 15 | 3702-263 | Cover, bottom tube | 1 |
| 16 | L073-407 | Screw, fillister hd, 6-32 in. UNF x 1/4 in. lg | 6 |
| 17 | 3702-203 | Bottom tube | 1 |
| 18 | L072-005 | Screw, csk, 4-40 in. UNC x 3/4 in. lg | 8 |
| 19 | 3702-234 | Track clamp, top | 4 |
| 20 | 3702-258 | Track, bottom tube | 4 |
| 21 | L800-042 | Spirol pin, 1/8 in. dia x 1 in. lg | 4 |
| 22 | 3702-252 | Stud shaft, cord | 2 |
| 23 | L075-021 | Screw, skt csk hd, 10-32 in. UNC x 1/2 in. lg | 10 |
| 24 | L072-035 | Screw, slotted csk hd, 4-40 in. UNC x 3/8 in. lg | 4 |
| 25 | L073-906 | Screw, skt cap hd, 6-32 in. UNC x 1/2 in. lg | 4 |
| 26 | 3702-244 | Shaft, bottom pulley | 2 |
| 27 | 3702-246 | Spacer | 4 |
| 28 | N200-002 | Bearing, ball | 2 |
| 29 | 3702-245 | Pulley, bottom cord | 2 |
| 30 | J550-001 | Mushroom buffer | 2 |

## Fig 6.4 Fulmar Pedestal - Bottom Tube (Cont)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 31 | 3702-243 | Stop, bottom tube | 2 |
| | 3702-35 | Bearing assembly, comprising: | 4 |
| 3 | 3176-228 | Shim | 2 |
| 4 | P203-005 | Bearing, needle roller, NK1B5902 | 1 |
| 6 | L075-804 | Grub screw, skt hd, 10-32 in. UNF x 1/4 in. lg | 1 |
| 32 | 3702-207 | Bracket roller | 1 |
| 33 | 3704-224 | Shaft | 1 |
| 34 | 3702-337 | Tube bracket (Fig 6.9) | 1 |

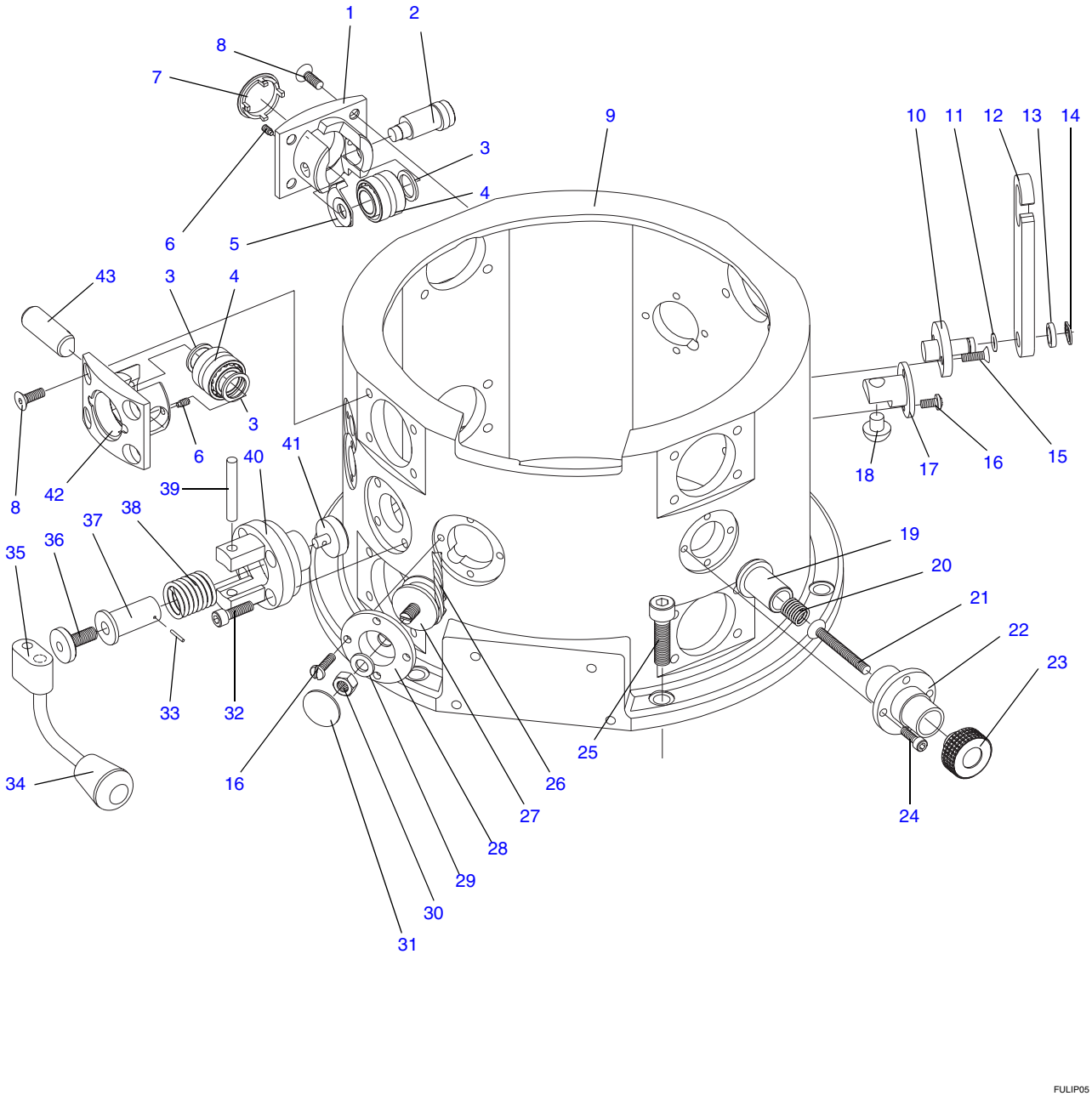


**Fig 6.5 Fulmar Pedestal - Fixed Tube**

## Fig 6.5 Fulmar Pedestal - Fixed Tube

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| | 3702-36 | Bearing assembly (adjusting), comprising: | 2 |
| 1 | 3702-391 | Bracket roller, adjusting | 1 |
| 2 | 3176-223 | bearing spindle | 1 |
| 3 | 3176-228 | Shim | 1 |
| 4 | P203-005 | Bearing, needle roller, NK1B5902 | 1 |
| 5 | 3176-222 | Adjuster, eccentric | 1 |
| 6 | L075-804 | Grub screw, skt hd, 10-32 in. UNF x 1/4 in. lg | 2 |
| 7 | 3702-356 | Plug, roller bracket | 8 |
| 8 | L076-002 | Screw, skt csk hd, 1/4 in. UNF x 1/2 in. lg | 32 |
| 9 | 3702-202 | Fixed tube | 1 |
| 10 | 3702-463 | Lock pivot, extended | 2 |
| 11 | Q001-016* | 'O' ring, 3/8 in. ID x 3/32 in. section | 2 |
| 12 | 3702-50 | Column lock assembly, RH | 1 |
| NI | 3702-49 | Column lock assembly, LH | 1 |
| 13 | M606-010 | Plastic washer | 2 |
| 14 | L701-007 | External circlip, Anderton 1400-3/8 | 2 |
| 15 | L075-022 | Screw, skt csk hd, 10-32 in. UNF x 1/2 in. lg | 4 |
| 16 | L075-503 | Screw, pan hd, 10-32 in. UNF x 1/2 in. lg | 12 |
| 17 | 3702-240 | Stop, fixed tube | 2 |
| 18 | J550-001 | Mushroom buffer | 2 |
| | 3267-63 | Friction assembly, comprising: | 1 |
| 19 | 3702-901SP* | Friction shaft assembly | 1 |
| 20 | J532-039 | Compression spring | 1 |
| 21 | M007-909 | Screw, skt csk hd, M6 x 40 mm lg | 1 |
| 22 | 3267-309 | Friction body | 1 |
| 23 | C510-131 | Knob | 1 |
| 24 | L075-921 | Screw, skt cap hd, 10-32 in. UNF x 1/2 in. lg | 4 |
| 25 | L078-908 | Screw, cap head, socket, 3/8-24UNC x 7/8 in. long | 6 |
| 26 | 3702-903SP* | 3-strand pre-stretched Terylene cord, 1/4 in. dia x 28 in. lg (Fig 6.3) | 2 |
| 27 | 3702-242 | Cord anchor, adjustable | 2 |
| 28 | 3702-241 | Bracket, anchor | 2 |

## Fig 6.5 Fulmar Pedestal - Fixed Tube (Cont)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 29 | L602-111 | Washer, 5/6 in. UNF | 2 |
| 30 | L501-165 | Nut, full, 5/6 in. UNF | 2 |
| 31 | Q300-114 | Hole plug, P-1000 | 2 |
| 32 | L076-924 | Screw, skt cap hd, 1/4 in. UNF x 7/8 in. lg | 4 |
| | 3741-16 | Brake assembly, comprising: | 1 |
| 33 | L800-019 | Spirol pin, 1/16 in. dia x 1/2 in. lg | 1 |
| 34 | C510-035 | Knob | 1 |
| 35 | 3702-25 | Handle assembly | 1 |
| 36 | 3702-322 | Adjuster | 1 |
| 37 | 3702-321 | Plunger | 1 |
| 38 | J532-036 | Compression spring | 1 |
| 39 | L801-065 | Dowel pin, 1/4 in. dia x 1 3/4 in. lg | 1 |
| 40 | 3702-320 | Body | 1 |
| 41 | 3702-900SP* | Brake disc assembly | 1 |
| | 3702-35 | Bearing assembly, comprising: | 4 |
| 3 | 3176-228 | Shim | 2 |
| 4 | P203-005 | Bearing, needle roller, NK1B5902 | 1 |
| 6 | L075-804 | Grub screw, skt hd, 10-32 in. UNF x 1/4 in. lg | 1 |
| 42 | 3702-207 | Bracket roller | 1 |
| 43 | 3704-224 | Shaft | 1 |

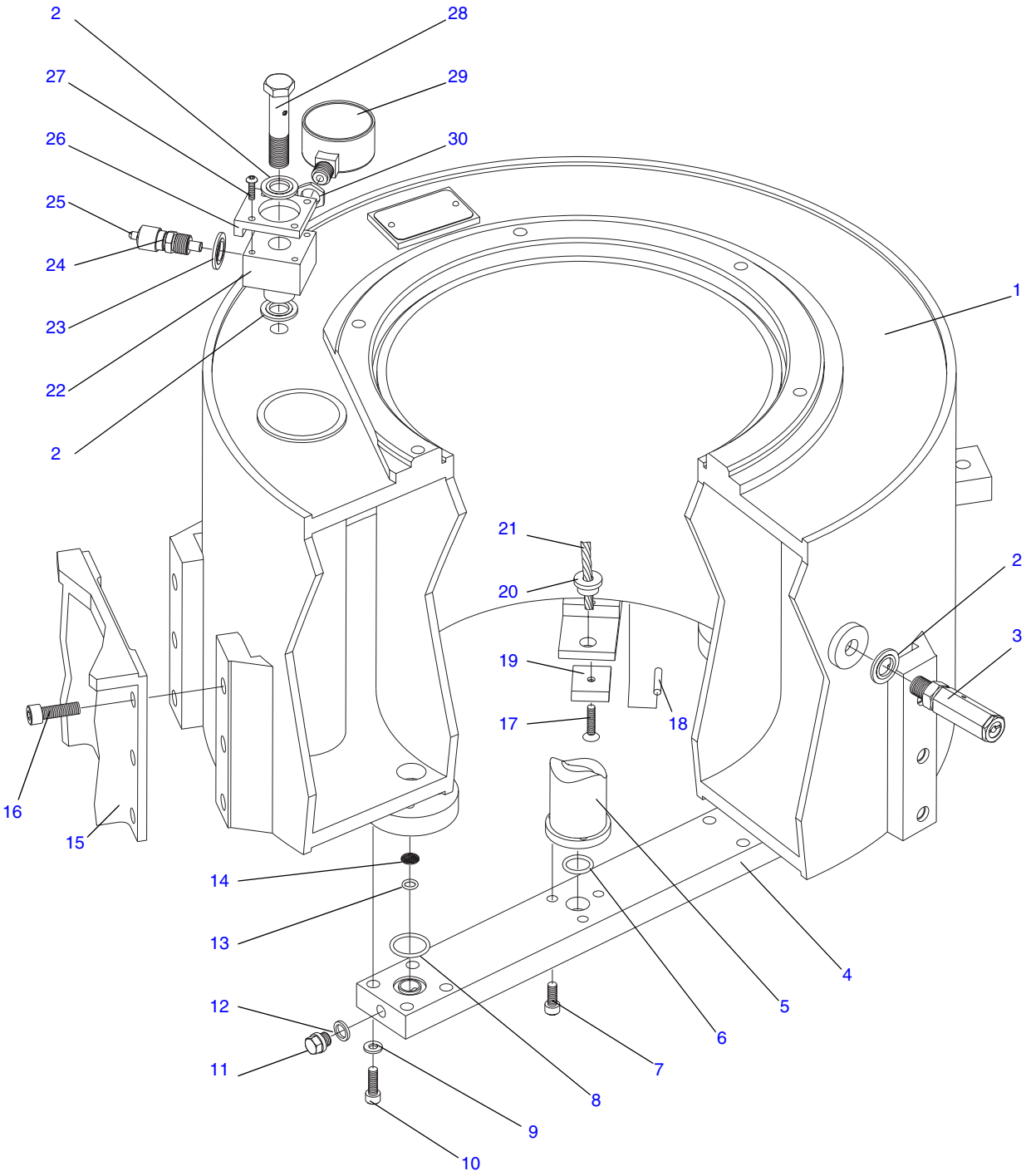


**Fig 6.6 Fulmar Pedestal - Tank**

## Fig 6.6 Fulmar Pedestal - Tank

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 1 | 3702-42 | Pressure tank | 1 |
| 2 | Q200-011* | Bonded seal, Dowty PP-45-B | 1 |
| 3 | 3702-46 | Safety valve assembly | 1 |
| 4 | 3702-255 | Manifold | 1 |
| 5 | 3702-14 | Ram assembly (Fig 6.7) | 1 |
| 6 | Q900H006* | 'O' ring, 3/4 in. ID x 3/32 in. sect | 1 |
| 7 | L075-918 | Screw, skt cap hd, 10-32 in. UNF x 5/8 in. lg | 3 |
| 8 | Q001-030* | 'O' ring, 7/8 in. OD x 3/32 in. sect | 1 |
| 9 | M600-007 | Washer, M6 | 8 |
| 10 | L076-922 | Screw, skt cap hd, 1/4 in. UNF x 5/8 in. lg | 8 |
| 11 | J003-038 | Plug, 1/8 in. BSP | 1 |
| 12 | Q200-008* | Bonded seal, Dowty PP-45-A | 1 |
| 13 | Q001-014* | 'O' ring, 3/4 in. ID x 0.07 in. sect | 1 |
| 14 | 3702-457 | Filter | 1 |
| 15 | 3702-27<br>3702-28<br>3702-29 | Wheel housing assembly (steering) (Fig 6.10)<br>Wheel housing assembly (adjustable sprocket) (Fig 6.11)<br>Wheel housing assembly (fixed sprocket) (Fig 6.12) | 1<br>1<br>1 |
| 16 | L078-908 | Screw, skt cap hd, 3/8 in. UNF x 7/8 in. lg | 18 |
| 17 | L075-020 | Screw, csk hd, 10-32 in. UNF x 3/4 in. lg | 2 |
| 18 | L800-077 | Spirol pin, 3/16 in. dia x 1 in. lg | 2 |
| 19 | 3702-357 | Bottom cord clamp | 2 |
| 20 | 3702-378 | Bush | 2 |
| 21 | 3702-904SP* | 3-strand pre-stretched Terylene cord, 1/4 in. dia x 50 in. lg (Fig 6.3) | 2 |
| | 3702-33 | Pressure gauge assembly, comprising: | 1 |
| 2 | Q200-011* | Bonded seal, Dowty PP-45-B | 2 |
| 22 | 3954-206 | Banjo | 1 |
| 23 | Q200-004* | Bonded seal, Dowty PP-45-3 | 1 |
| 24 | 3702-389 | Schrader valve | 1 |
| 25 | 3328-304 | Pressure release button | 1 |
| 26 | 3054-205 | Banjo clamp | 1 |
| 27 | M005-505 | Screw, skt butt hd, M4 x 12 mm lg | 4 |
| 28 | 3954-202 | Banjo bolt | 1 |

## Fig 6.6 Fulmar Pedestal - Tank (Cont)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 29 | J001-036 | Pressure gauge, 0-400 psi | 1 |
| 30 | 3419-227 | Adaptor nut | 1 |

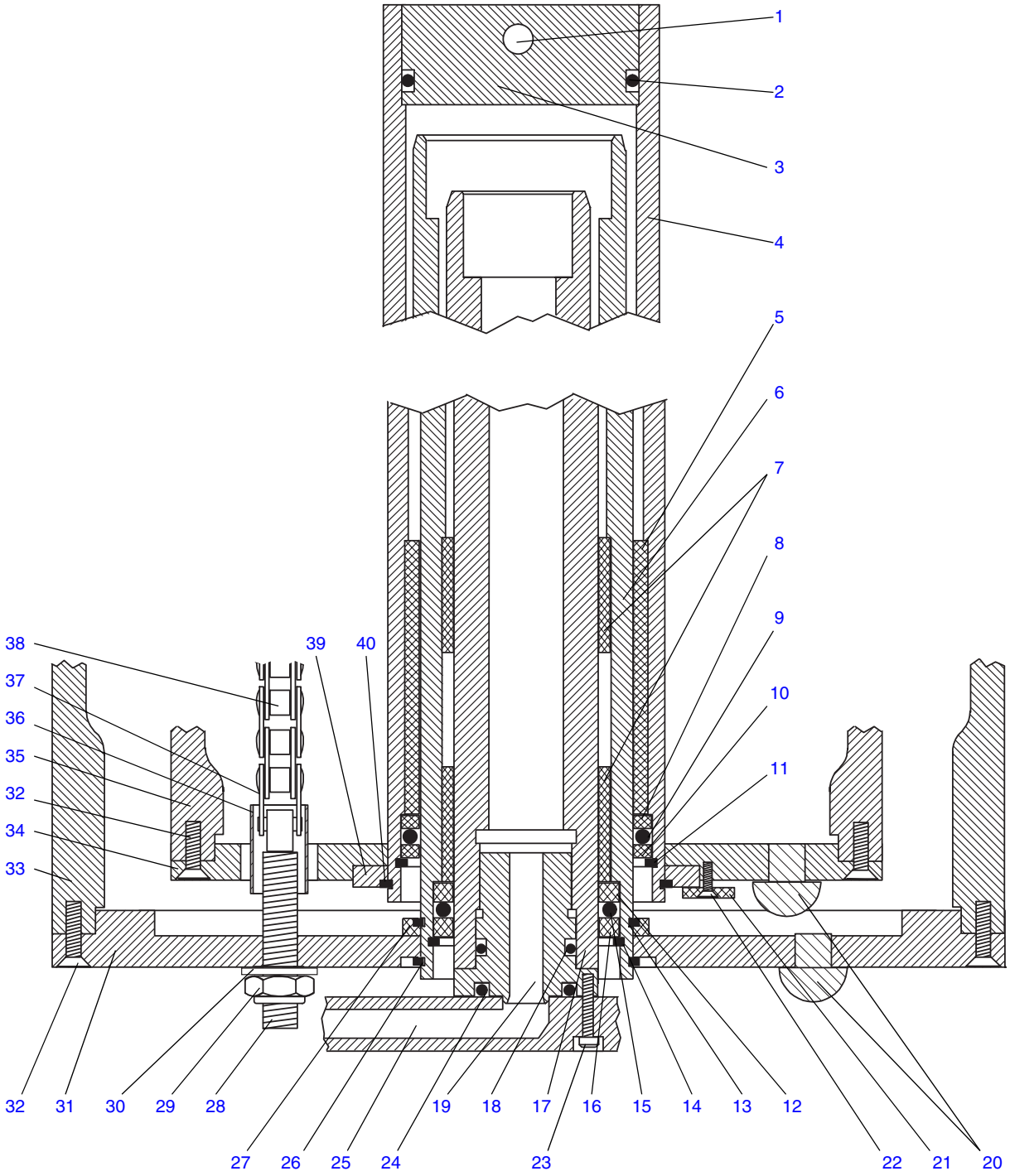


**Fig 6.7 Fulmar Pedestal - Ram Assembly and Ram Plates**

## Fig 6.7 Fulmar Pedestal - Ram Assembly and Ram Plates

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| | 3702-14 | Ram assembly, comprising: | |
| | 3702-15 | Cylinder assembly, 2nd stage, comprising: | 1 |
| 1 | L800-111 | Spirol pin, 1/4 in. dia x 2 1/2 in. long | 1 |
| 2 | Q900H012* | 'O' ring, 1 7/8 in. ID x 1/8 in. sect | 1 |
| 3 | 3702-222 | End plug | 1 |
| 4 | 3702-220 | Cylinder, 2nd stage | 1 |
| 5 | N001-031 | D U bush, Glacier ref 32DU40 | 1 |
| | 3702-16 | Cylinder assembly, 1st stage, comprising: | 1 |
| 6 | 3702-223 | Cylinder, 1st stage | 1 |
| 7 | N001-023 | D U bush, Glacier ref 24DU16 | 2 |
| 8 | 3702-221 | Seal retainer, 2nd stage | 1 |
| 9 | Q900H014* | 'O' ring, 2 in. ID x 1/8 in. sect | 1 |
| 10 | 3702-385 | Seal retainer, 2nd stage (circlip side) | 1 |
| 11 | M700-033 | Internal spring ring | 1 |
| 12 | 3720-224 | Seal retainer, 1st stage | 1 |
| 13 | M701-025 | External spring ring | |
| 14 | M701-020 | Internal spring ring | 1 |
| 15 | Q900H013* | 'O' ring, 1 1/2 in. ID x 1/8 in. sect | 1 |
| 16 | 3702-384 | Seal retainer, 1st stage (circlip side) | 1 |
| 17 | 3702-225 | Piston, 1st stage | 1 |
| 18 | Q001-038* | 'O' ring, 5/16 in. ID x 3/32 in. sect | 1 |
| 19 | 3702-226 | Plug, 1st stage piston | 1 |
| 20 | J550-001 | Mushroom buffer | 4 |
| 21 | 3702-386 | Plate | 1 |
| 22 | L073-001 | Screw, csk hd, 6-32 UNC x 3/8 in. lg | 1 |
| 23 | L075-918 | Screw, skt cap hd, 10-32 in. UNF x 5/8 in. lg | 3 |
| 24 | Q900H006* | 'O' ring, 3/4 in. ID x 3/32 in. sect | 1 |
| 25 | 3702-255 | Manifold | 1 |
| 26 | L701-028 | External circlip | 1 |
| 27 | 3702-388 | Thrust ring, 1st stage | 1 |
| 28 | 3702-261 | Chain screw, adjusting | 2 |

## Fig 6.7 Fulmar Pedestal - Ram Assembly and Ram Plates (Cont)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 29 | L501-170 | Nut, Nyloc, 5/16 in. UNF | 2 |
| 30 | L602-112 | Washer, 5/16in., heavy | 2 |
| 31 | 3702-259 | Ram plate, 1st stage | 1 |
| 32 | L075-006 | Screw, csk hd, 10-32 UNC x 5/8 in. lg | 12 |
| 33 | 3702-22 | Bottom tube assembly (Fig 6.4) | 1 |
| 34 | 3702-260 | Ram plate, 2nd stage | 1 |
| 35 | 3702-21 | Centre tube assembly (Fig 6.3) | 1 |
| 36 | C885-621 | Sleeve, h.75 x 1 in. lg | 2 |
| 37 | J202-061 | Connecting link, 3/8 in. pitch chain | 2 |
| 38 | J202-014 | Roller chain, 3/8 in. pitch, 83 pitches (Fig 6.3) | 2 |
| 39 | 3702-387 | Lock ring, circlip | 1 |
| 40 | M701-034 | Circlip, external | 1 |

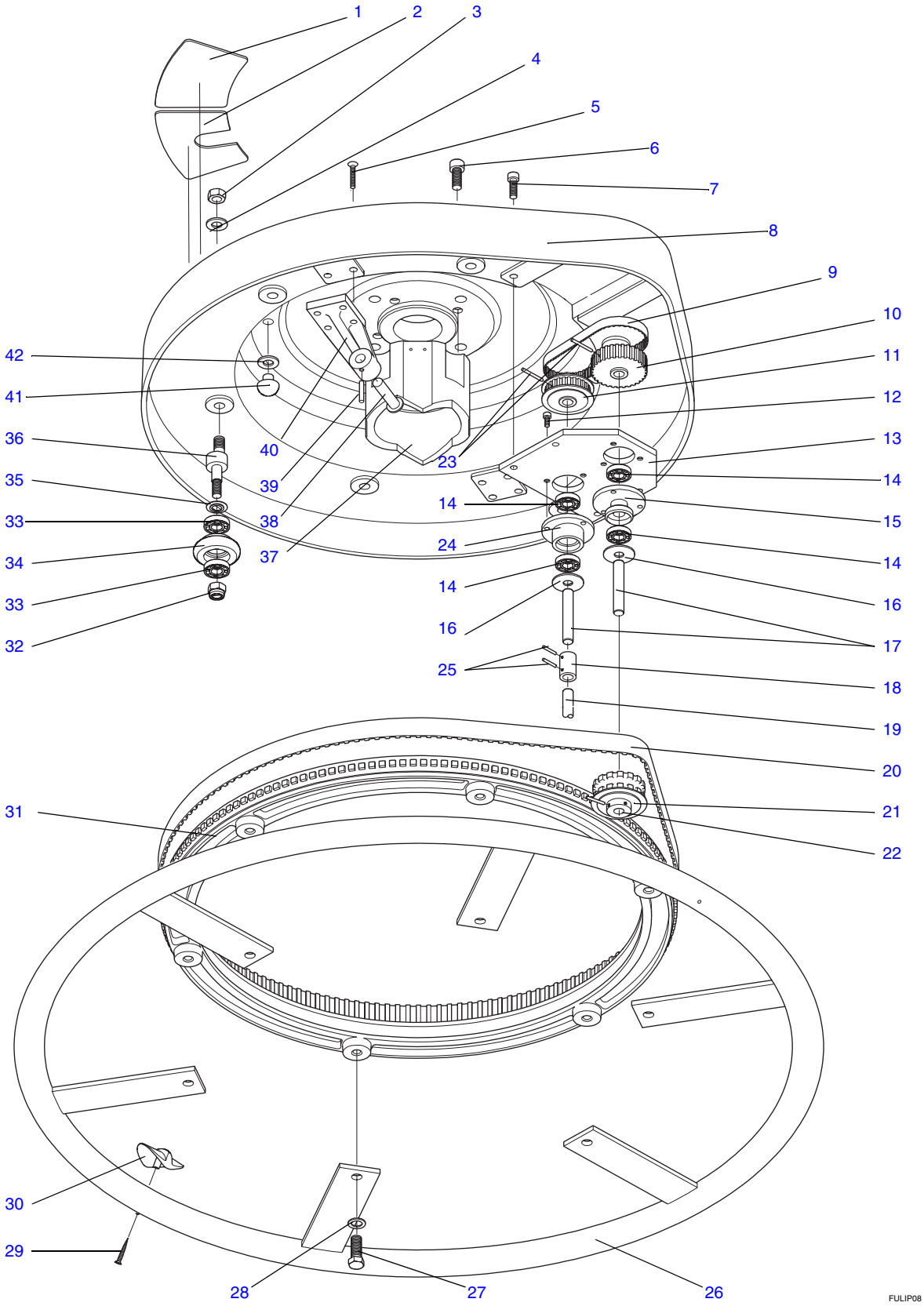


**Fig 6.8 Fulmar Pedestal - Weight Tray Assembly**

## Fig 6.8 Fulmar Pedestal - Weight Tray Assembly

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 1 | 3702-462 | Weight storage lining | 5 |
| 2 | 3702-460 | Weight storage lining | 4 |
| 3 | L501-191 | Nut, hex, 3/8 in. UNF | 6 |
| 4 | L602-123 | Washer, 3/8 in. | 6 |
| 5 | L076-010 | Screw, skt csk hd, 1/4 in. UNF x 3/4 in. lg | 8 |
| 6 | L077-920 | Screw, skt cap hd, 5/16 in. UNF x 5/8 in. lg | 4 |
| 7 | L076-921 | Screw, skt cap hd, 1/4 in. UNF x 5/8 in. lg | 4 |
| 8 | 3702-208 | Weight tray | 1 |
| 9 | J201-026 | Timing belt, Daval 110XL 037 | 1 |
| 10 | 3702-354 | Pulley, large | 1 |
| 11 | 3702-353 | Pulley, small | 1 |
| 12 | L075-916 | Screw, skt cap hd, 10-32 in. UNF x 1/4 in. lg | 66 |
| 13 | 3702-270 | Plate, gear | 1 |
| 14 | N200-002 | Ballrace, Hoffman S3 | 4 |
| 15 | 3702-277 | Housing, bearing, top | 1 |
| 16 | 3741-268 | Shim, 13/16 in. dia | 2 |
| 17 | 3702-279 | Shaft, belt pulley | 2 |
| 18 | 3702-280 | Coupling, shaft (Fig 6.9) | 1 |
| 19 | 3702-24 | Steering assembly (Fig 6.9) | 1 |
| 20 | J201-031 | Timing belt, Daval 600L 075 | 1 |
| 21 | 3702-311 | Pulley, driven | 1 |
| 22 | L800-036 | Spirol pin, 3/32 in. dia x 3/4 in. lg | 1 |
| 23 | L800-037 | Spirol pin, 3/32 in. dia x 1 in. lg | 2 |
| 24 | 3702-278 | Housing, pulley bearing | 1 |
| 25 | L800-029 | Spirol pin, 3/32 in. dia x 5/8 in. lg | 2 |
| 26 | 3702-266 | Steering wheel | 1 |
| 27 | L077-713 | Screw, hex hd, 5/16 in. UNF x 3/4 in. lg | 6 |
| 28 | L602-111 | Washer, 5/16 in. | 6 |
| 29 | L101-022 | Screw, self-tapping, No. 6 x 1 in. lg | 2 |
| 30 | 3419-228 | Steering indicator | 2 |
| 31 | 3702-208 | Steering ring | 1 |

## Fig 6.8 Fulmar Pedestal - Weight Tray Assembly (Cont)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| | 3702-41 | Steering roller assembly, comprising: | 6 |
| 32 | L501-170 | Nut, Nyloc, 5/16 in. UNF | 1 |
| 33 | P200-244 | Bearing, FAG 609.2ZR | 2 |
| 34 | 3702-269 | Roller, steering ring | 1 |
| 35 | 3702-392 | Washer | 1 |
| 36 | 3702-265 | Shaft steering pulley | 1 |
| 37 | 3702-205 | Top tube (Fig 6.2) | 1 |
| 38 | 3702-334 | Lock pin | 2 |
| 39 | L800-052 | Spirol pin, 1/8 in. dia x 7/8 in. lg | 2 |
| 40 | 3702-340 | Lock bracket, LH | 1 |
| NI | 3702-333 | Lock bracket, RH | 1 |
| 41 | J550-001 | Mushroom buffer | 2 |
| 42 | L602-122 | Washer, 3/8 in. | 2 |

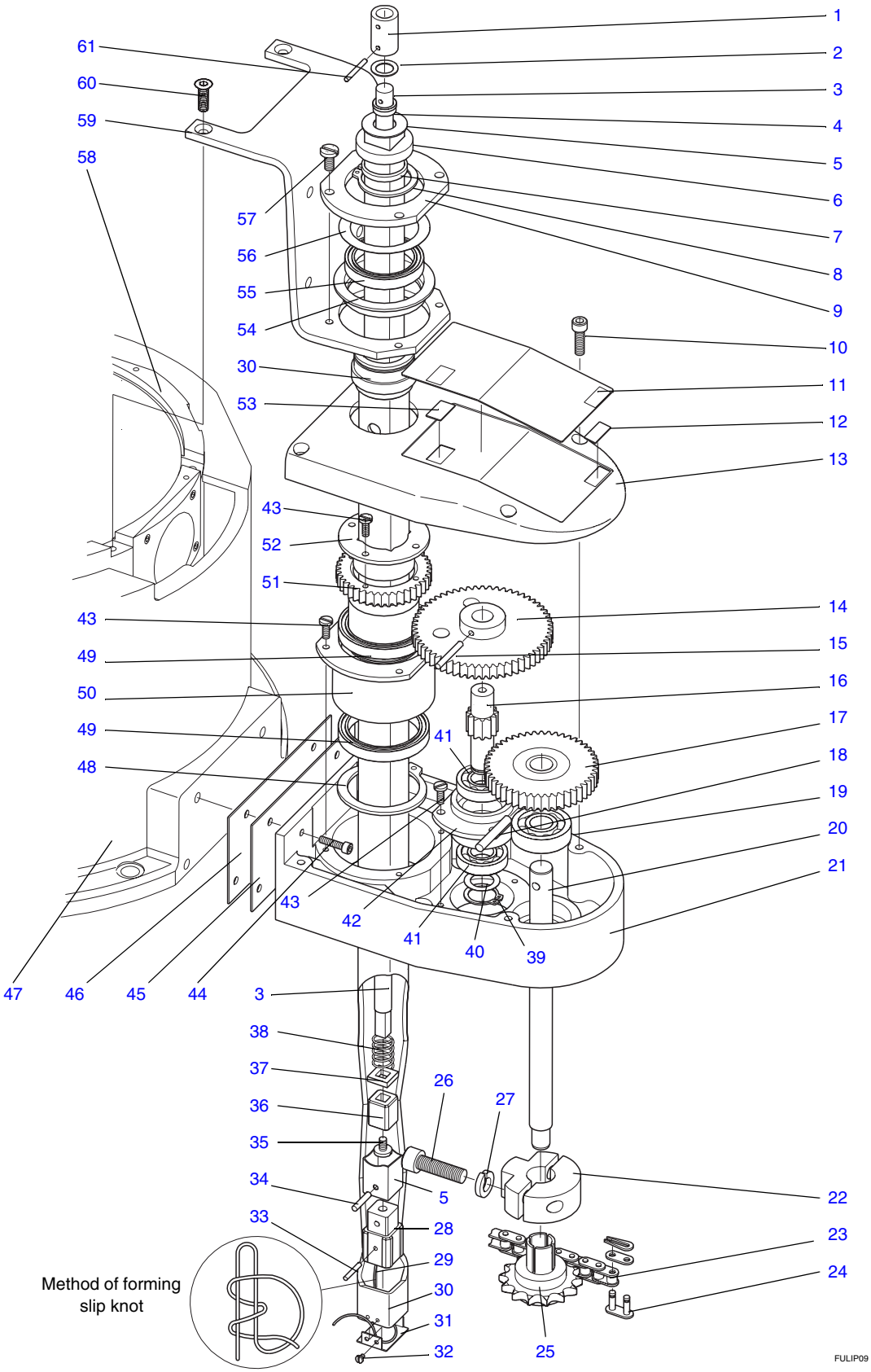


**Fig 6.9 Fulmar Pedestal - Steering Assembly**

## Fig 6.9 Fulmar Pedestal - Steering Assembly

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 1 | 3702-280 | Coupling, shaft (Fig 6.8) | 1 |
| 2 | 3702--374 | Washer | 1 |
| 3 | 3702-313 | Drive shaft | 1 |
| 4 | 3702-365 | Square tube bush | 1 |
| 5 | 3702-19 | Small drive tube, brazed | 1 |
| 6 | 3702-315 | Buffer | 1 |
| 7 | 3702-364 | Large square tube bush | 1 |
| 8 | L701-01 | External circlip, 1400-131 | 1 |
| 9 | 3702-312 | Tube bearing clamp | 1 |
| 10 | L075-920 | Screw, skt cap hd, 10-32 in. UNF x 1/2 in. lg | 4 |
| 11 | 3423-12 | Steering box graphic | 1 |
| 12 | 3702-276 | Serial No. label | 1 |
| 13 | 3702-215 | Bracket cover | 1 |
| 14 | 3702-292 | Gear, intermediate | 1 |
| 15 | L800-042 | Spirol pin, 1/8 in. dia x 1 in. lg | 1 |
| 16 | 3702-291 | Shaft, intermediate gear | 1 |
| 17 | 3702-293 | Gear sprocket | 1 |
| 18 | L800-083 | Spirol pin, 3/16 in. dia x 1 1/4 in. lg | 1 |
| 19 | N200-198 | Ballrace, RLS4 | 1 |
| 20 | 3702-294 | Shaft, transfer | 1 |
| 21 | 3702-214 | Bracket, gear | 1 |
| 22 | 3702-238 | Clamp, sprocket | 1 |
| 23 | J202-013 | Roller chain, simple, 3/8 in. pitch, 50 pitches (Fig 6.10) | 1 |
| 24 | J202-061 | Chain, link, (connecting), 3/8 in. pitch | 2 |
| 25 | 3702-295 | Sprocket, small | 1 |
| 26 | L077-922 | Screw, skt cap hd, 5/16 in. UNF x 1 in. lg | 2 |
| 27 | L601-109 | Spring washer, 5/16 in | 2 |
| 28 | 3702-309 | Large drive plug | 1 |
| 29 | 3702-902SP* | Cord, nylon braided | 18 in. |
| 30 | 3702-17 | Large drive tube assembly | 1 |
| 31 | 3702-370 | Cord clamp | 1 |

## Fig 6.9 Fulmar Pedestal - Steering Assembly (Cont)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 32 | L071-503 | Screw, pan hd, 2-56 in. UNC x 3/16 in. lg | 3 |
| 33 | L800-035 | Spirol pin, 3/32 in. dia x 5/8 in. lg | 1 |
| 34 | L800-050 | Spirol pin, 1/8 in. dia x 5/8 in. lg | 1 |
| 35 | L100-007 | Screw, 4BA, Vinten special | 1 |
| 36 | 3419-230 | Drive plug | 1 |
| 37 | 3419-268 | Steering buffer | 1 |
| 38 | J532-077 | Spring | 1 |
| 39 | L701-010 | External circlip, 1400-1/2 in. | 1 |
| 40 | 3506-15 | Shim | 1 |
| 41 | N200-003 | Ballrace, KLNJ1/2 in. | 2 |
| 42 | 3702-290 | Housing, intermediate gear | 1 |
| 43 | L073-503 | Screw, pan hd, 6-32 in. UNC x 3/8 in. lg | 12 |
| 44 | L076-921 | Screw, skt cap hd, 1/4 in. UNF x 5/8 in. lg | 4 |
| 45 | 3702-358 | Shim, neoprene | A/R |
| 46 | 3702-368 | Shim, neoprene (thin) | A/R |
| 47 | 3702-202 | Fixed tube (Fig 6.5) | 1 |
| 48 | L701-019 | External circlip, 1400-40 | 1 |
| 49 | N200-408 | Ballrace, T25 | 2 |
| 50 | 3702-289 | Housing, transfer gear | 1 |
| 51 | 3702-288 | Transfer gear | 1 |
| 52 | 3702-307 | Drive bush | 1 |
| 53 | 3328-391 | Label, year of manufacture | 1 |
| 54 | 3702-310 | Tube bearing bush | 1 |
| 55 | N200-405 | Ballrace, T21 | 1 |
| 56 | 3702-377 | Bearing dust shield | 1 |
| 57 | L075-501 | Screw, pan hd, 10-32 in. UNC x 3/8 in. lg | 4 |
| 58 | 3702-203 | Bottom tube (Fig 6.4) | 1 |
| 59 | 3702-337 | Tube bracket | 1 |
| 60 | L075-021 | Screw, skt csk hd, 10-32 in. UNC x 1/2 in. lg | 2 |
| 61 | L800-029 | Spirol pin, 3/32 in. dia x 5/8 in. lg | 1 |

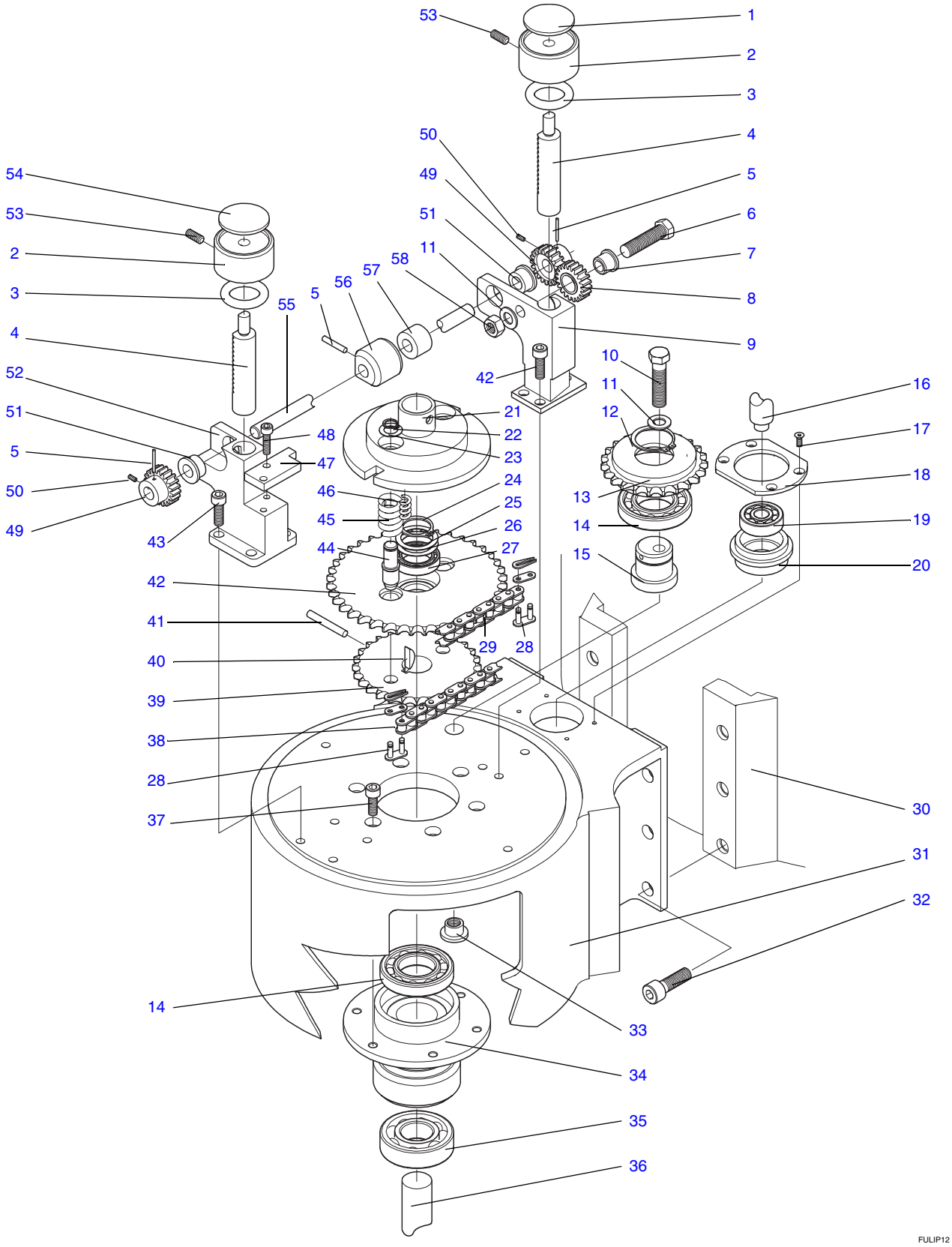


**Fig 6.10 Fulmar Pedestal - Wheel Housing Assembly (Steering)**

## Fig 6.10 Fulmar Pedestal - Wheel Housing Assembly (Steering)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 1 | 3702-348 | Steer label | 1 |
| 2 | 3702-346 | Pedal | 2 |
| 3 | Q900H007* | 'O' ring, R4081, 1 1/16 in. OD x 13/16 in. ID | 2 |
| 4 | 3702-345 | Pedal shaft | 2 |
| 5 | L800-040 | Spirol pin, 1/8 in. dia x 3/4 in. lg | 3 |
| 6 | L077-711 | Bolt, hex hd, 5/16 in. UNF x 1 1/14 in. lg | 1 |
| 7 | 3702-342 | Flanged bearing | 1 |
| 8 | 3702-341 | Reverse gear | 1 |
| 9 | 3702-338 | Steering bearing bracket | 1 |
| 10 | L077-702 | Bolt, hex hd, 5/16 in. UNF x 1 1/2 in. lg | 1 |
| 11 | L602-112 | Washer, 5/16 in. UNF | 2 |
| 12 | L701-016 | Circlip, external | 1 |
| 13 | 3702-299 | Adjusting sprocket, steering | 1 |
| 14 | N200-007 | Bearing | 2 |
| 15 | 3702-300 | Shaft, eccentric | 1 |
| 16 | 3702-294 | Transfer shaft (Fig 6.9) | 1 |
| 17 | L073-011 | Screw, csk hd, 6-32 in. UNF x 3/8 in. lg | 4 |
| 18 | 3702-297 | Bearing housing clamp | 1 |
| 19 | P206-001 | Bearing, self-aligning | 1 |
| 20 | 3702-296 | Bearing housing, drive sprocket | 1 |
| 21 | 3702-285 | Clutch body | 1 |
| 22 | L701-007 | Circlip, external | 1 |
| 23 | 3419-111 | Packing washer | A/R |
| 24 | M701-028 | Circlip, external | 1 |
| 25 | 3702-416 | Shim, 0.005 in. | A/R |
| 26 | 3702-417 | Shim, 0.010 in. | A/R |
| 27 | N200-400 | Bearing | 1 |
| 28 | J202-061 | Chain, link, (connecting), 3/8 in. pitch | 2 |
| 29 | J202-012 | Roller chain, 3/8 in. pitch, 307 pitches (Fig 6.11) (Fig 6.12) | 1 |
| 30 | 3702-42 | Pressure tank (Fig 6.6) | 1 |
| 31 | 3702-209 | Wheel housing (steering) | 1 |

## Fig 6.10 Fulmar Pedestal - Wheel Housing Assembly (Steering) (Cont)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 32 | L078-908 | Screw, skt cap hd, 3/8 in. UNF x 7/8 in. lg | 6 |
| 33 | 3702-301 | Tapped bush, eccentric | 1 |
| 34 | 3556-2 | Bearing housing | 1 |
| 35 | N200-202 | Bearing | 1 |
| 36 | 3702-376 | Shaft, steering wheel (Fig 6.13) | 1 |
| 37 | L021-904 | Screw, skt cap hd, 1/4 in. BSF x 1/2 in. lg | 6 |
| 38 | J202-013 | Roller chain, 3/8 in. pitch, 50 pitches (Fig 6.9) | 1 |
| 39 | 3702-284 | Sprocket, fixed wheel | 1 |
| 40 | L805-010 | Woodruff key No. 9 | 1 |
| 41 | L800-079 | Spirol pin, 3/16 in. dia x 1 3/8 in. lg | 1 |
| 42 | 3702-281 | Sprocket, steering wheel | 1 |
| 43 | L076-925 | Screw, skt cap hd, 1/4 in. UNF x 1/2 in. lg | 7 |
| 44 | 3702-383 | Crab/steer pin | 1 |
| 45 | J532-042 | Compression spring, Flexo 173206 | 1 |
| 46 | J532-051 | Compression spring, Flexo 103206 | 2 |
| 47 | 3702-347 | Steering lock key | 1 |
| 48 | L075-921 | Screw, skt cap hd, 10-32 in. UNF x 1/2 in. lg | 2 |
| 49 | 3702-343 | Changeover gear | 2 |
| 50 | L073-801 | Grub screw, skt, 10-32 in. UNF x 1/4 in. lg | 2 |
| 51 | N002-013 | Bearing, Oilite, FCT 396 | 2 |
| 52 | 3702-339 | Crab bearing bracket | 1 |
| 53 | L075-802 | Grub screw, skt, 10-32 in. UNF x 3/8 in. lg | 2 |
| 54 | 3702-349 | Crab label | 1 |
| 55 | 3702-344 | Changeover shaft | 1 |
| 56 | 3702-286 | Crab/steer cam | 1 |
| 57 | 3702-362 | Changeover buffer | 1 |
| 58 | L501-165 | Nut, full, 5/16 in. UNF | 1 |

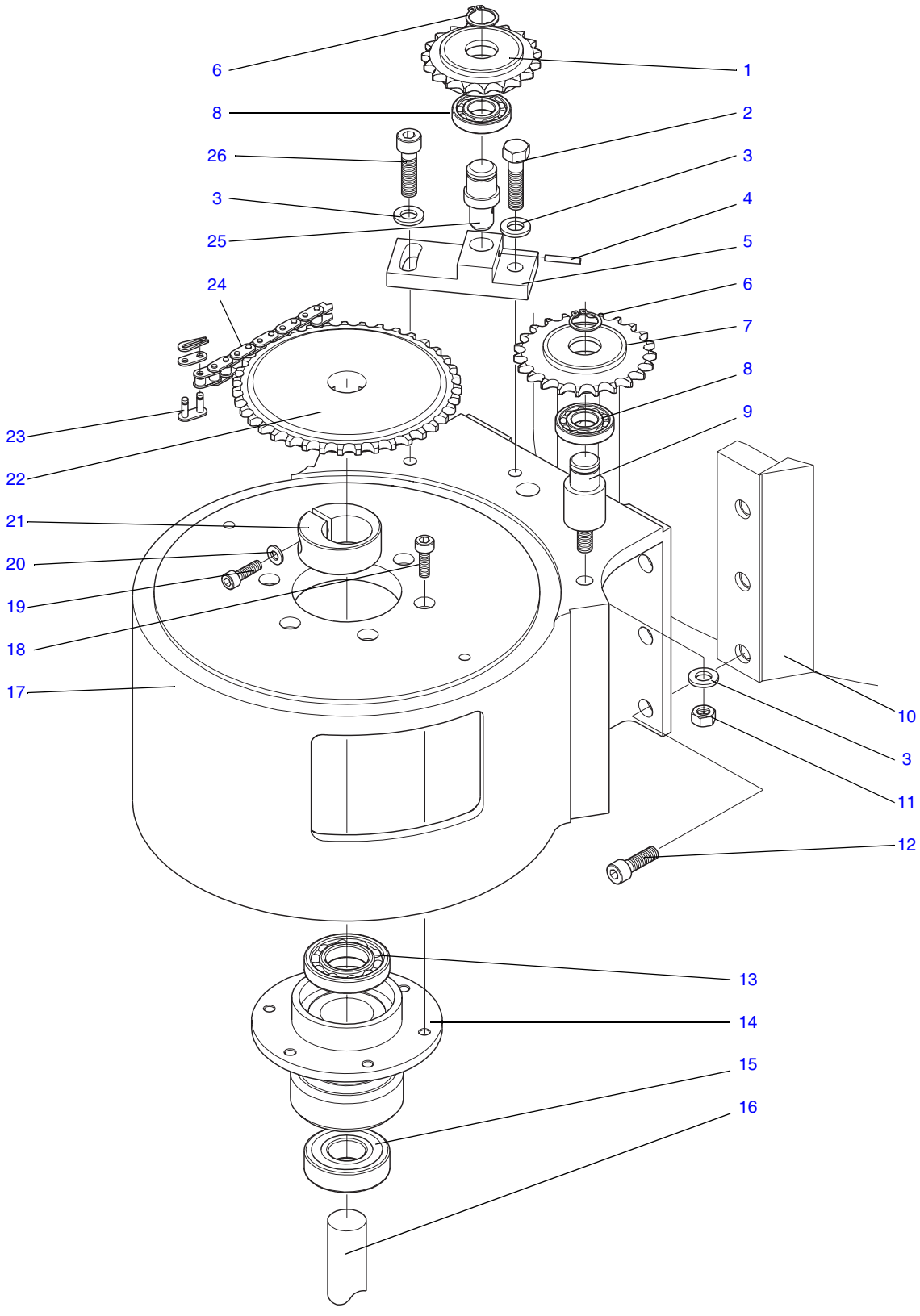


**Fig 6.11 Fulmar Pedestal - Wheel Housing Assembly (Adjustable Sprocket)**

## Fig 6.11 Fulmar Pedestal - Wheel Housing Assembly (Adjustable Sprocket)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 1 | 3702-302 | Sprocket, adjustable | 1 |
| 2 | L077-712 | Bolt, hex hd, 5/16 in. UNF x 1 in. lg | 1 |
| 3 | L602-112 | Washer, 5/16 in. UNF | 3 |
| 4 | L800-040 | Spirol pin, 1/8 in. dia x 3/4 in. lg | 1 |
| 5 | 3702-305 | Adjuster, sprocket | 1 |
| 6 | L701-012 | External circlip | 2 |
| 7 | 3702-351 | Guide sprocket | 1 |
| 8 | N200-004 | Bearing | 2 |
| 9 | 3702-303 | Stub shaft, sprocket | 1 |
| 10 | 3702-42 | Pressure tank (Fig 6.6) | 1 |
| 11 | L501-165 | Nut, full, 5/16 in. UNF | 1 |
| 12 | L078-908 | Screw, skt cap hd, 3/8 in. UNF x 7/8 in. lg | 6 |
| 13 | N200-007 | Bearing | 1 |
| 14 | 3556-2 | Bearing housing | 1 |
| 15 | N200-202 | Bearing | 1 |
| 16 | 3702-375 | Shaft, fixed wheel (Fig 6.13) | 1 |
| 17 | 3702-212 | Wheel housing | 1 |
| 18 | L021-904 | Screw, skt cap hd, 1/4 in. BSF x 1/2 in. lg | 6 |
| 19 | L076-923 | Screw, skt cap hd, 1/4 in. UNF x 1 in. lg | 1 |
| 20 | L601-108 | Spring washer, 1/4 in. | 1 |
| 21 | 3702-236 | Clamp, sprocket | 1 |
| 22 | 3702-235 | Sprocket, fixed wheel | 1 |
| 23 | J202-061 | Chain, link, (connecting), 3/8 in. pitch | 2 |
| 24 | J202-012 | Roller chain, 3/8 in. pitch, 307 pitches (Fig 6.10) (Fig 6.12) | 1 |
| 25 | 3702-304 | Stub shaft | 1 |
| 26 | L007-921 | Screw, skt cap hd, 5/16 in. UNF x 7/8 in. lg | 1 |

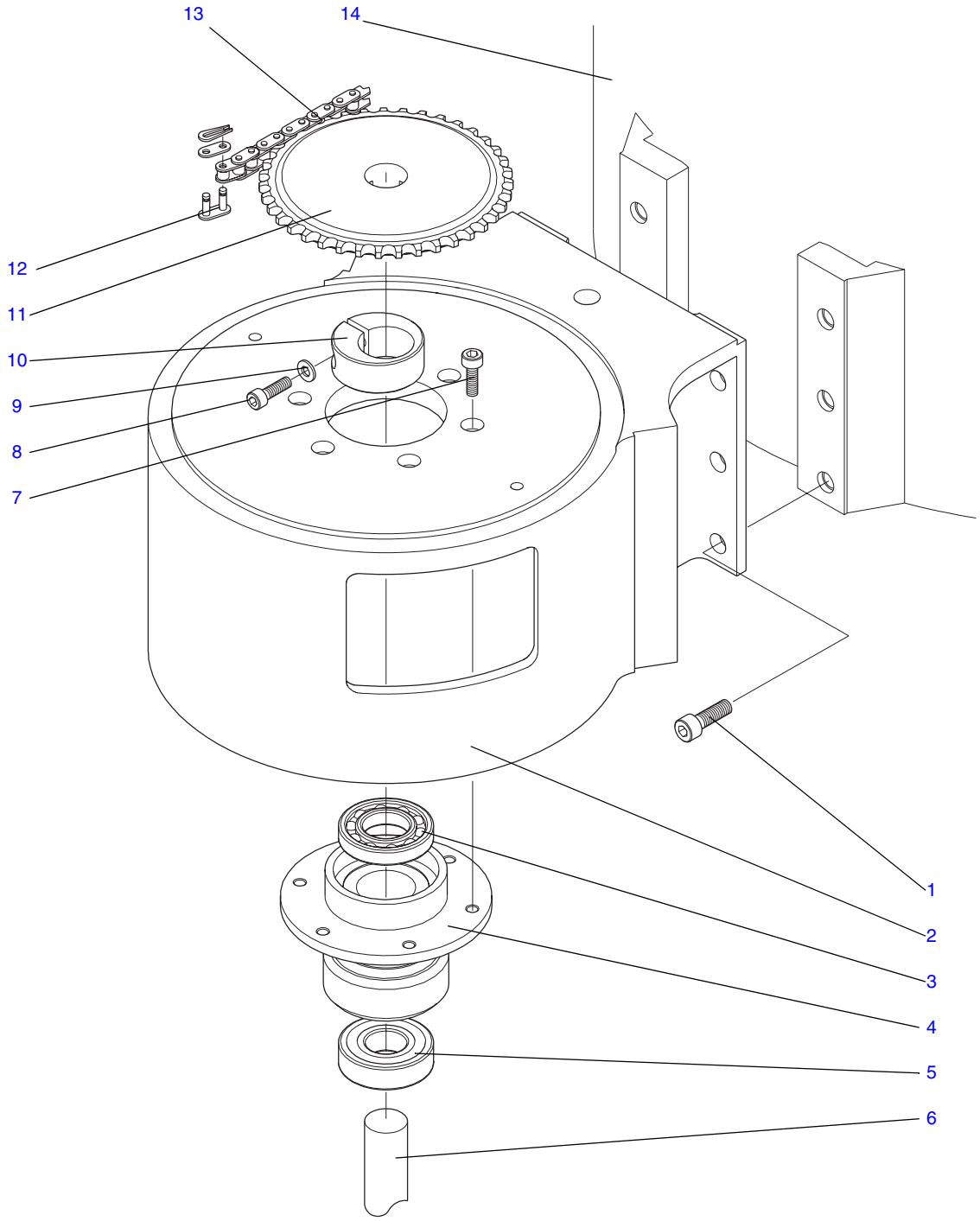


**Fig 6.12 Fulmar Pedestal - Wheel Housing Assembly (Fixed)**

## Fig 6.12 Fulmar Pedestal - Wheel Housing Assembly (Fixed)

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 1 | L078-908 | Screw, skt cap hd, 3/8 in. UNF x 7/8 in. lg | 6 |
| 2 | 3702-212 | Wheel housing | 1 |
| 3 | N200-007 | Bearing | 1 |
| 4 | 3556-2 | Bearing housing | 1 |
| 5 | N200-202 | Bearing | 1 |
| 6 | 3702-375 | Shaft, fixed wheel (Fig 6.13) | 1 |
| 7 | L021-904 | Screw, skt cap hd, 1/4 in. BSF x 1/2 in. lg | 6 |
| 8 | L076-923 | Screw, skt cap hd, 1/4 in. UNF x 1 in. lg | 1 |
| 9 | L601-108 | Spring washer, 1/4 in. | 1 |
| 10 | 3702-236 | Clamp, sprocket | 1 |
| 11 | 3702-235 | Sprocket, fixed wheel | 1 |
| 12 | J202-061 | Chain, link, (connecting), 3/8 in. pitch | 2 |
| 13 | J202-012 | Roller chain, 3/8 in. pitch, 307 pitches (Fig 6.10) (Fig 6.11) | 1 |
| 14 | 3702-42 | Pressure tank (Fig 6.6) | 1 |

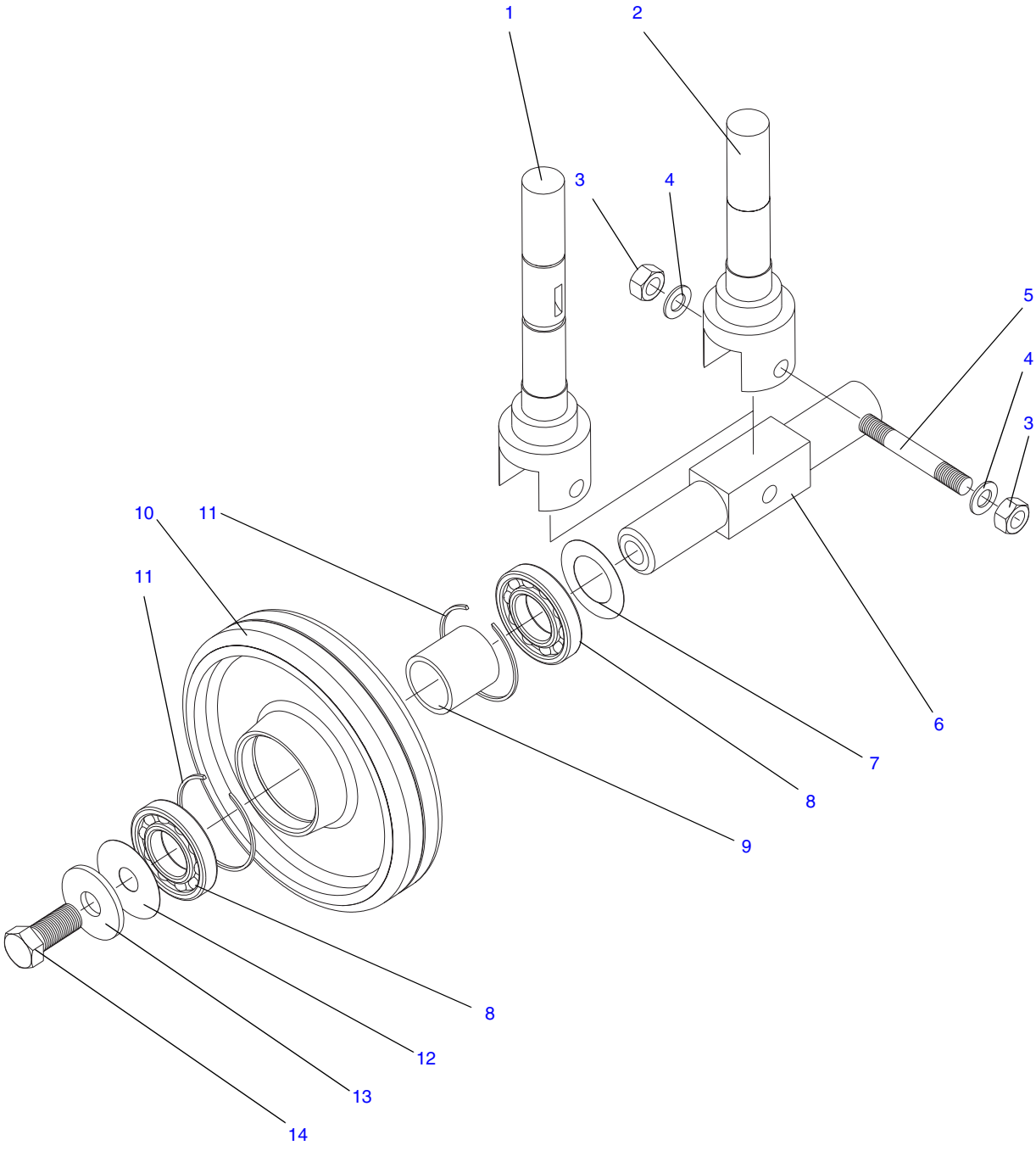


**Fig 6.13 Fulmar Pedestal - Wheel Assembly**

## Fig 6.13 Fulmar Pedestal - Wheel Assembly

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 1 | 3702-376 | Shaft, steering wheel (Fig 6.10) | 1 |
| 2 | 3702-375 | Shaft, fixed wheel (Fig 6.11)(Fig 6.12) | 1 |
| 3 | L501-191 | Nut, full, 3/8 in. UNF | 2 |
| 4 | L601-263 | Washer, Belleville | 2 |
| 5 | 3702-371 | Axle pivot | 1 |
| 6 | 3702-239 | Axle | 1 |
| 7 | 3419-167 | Packing shim, large | 2 |
| 8 | N200-007 | Ballrace, Hoffman S10 | 4 |
| 9 | 3419-321 | Wheel bearing spacer | 2 |
| | 3419-100A | Wheel assembly, each comprising: | 2 |
| 10 | 3419-274 | Wheel | 1 |
| 11 | M700-025 | Circlip, internal, 2 in. bore | 2 |
| 12 | 3419-322 | Outer wheel shim | 2 |
| 13 | 3419-23 | Outer wheel washer | 2 |
| 14 | L025-707 | Bolt, hex hd, 1/2 in. BSF x 3/4 in. lg | 2 |

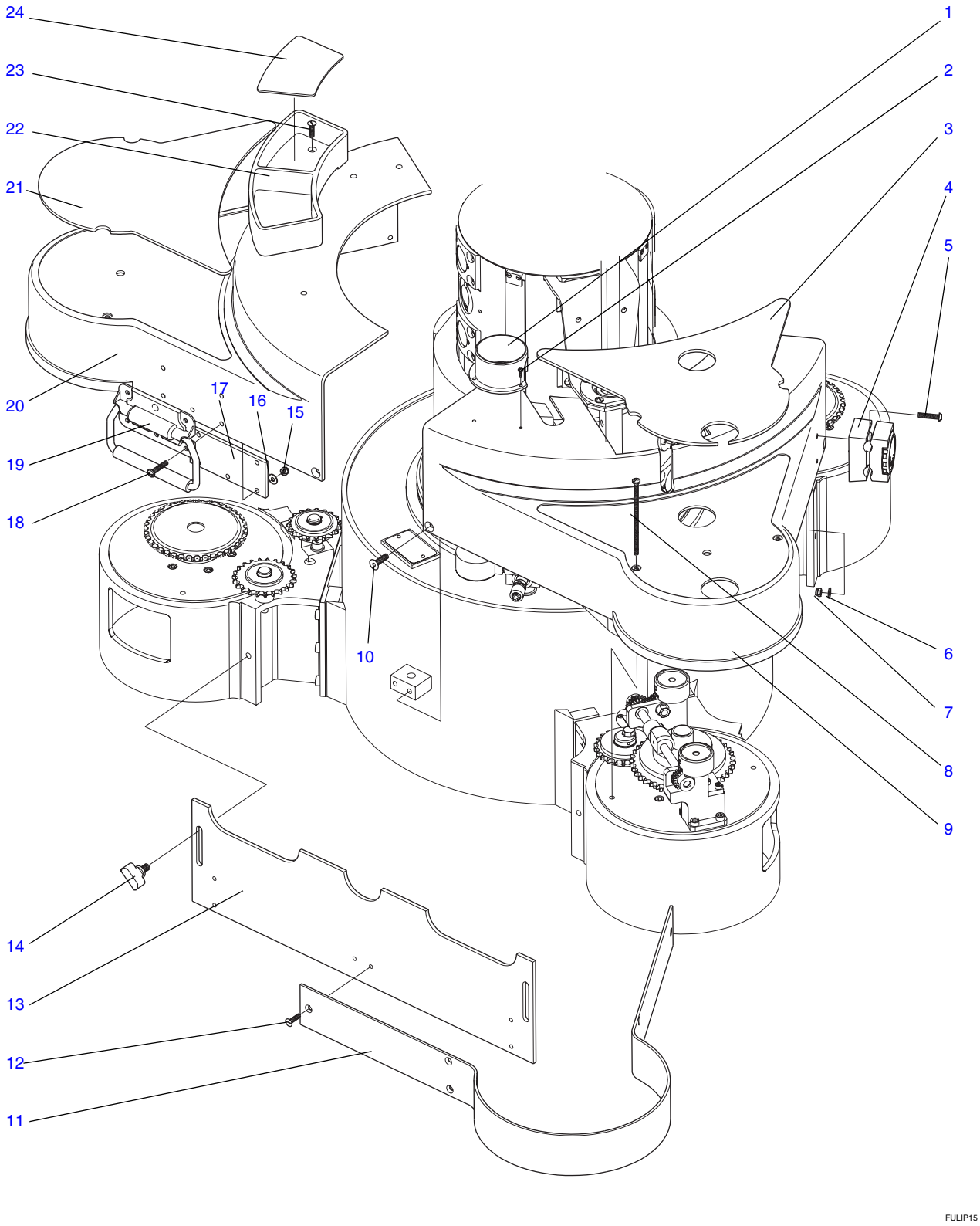


**Fig 6.14 Fulmar Pedestal - Covers and Cable Guards**

## Fig 6.14 Fulmar Pedestal - Covers and Cable Guards

| Item | Part No. | Nomenclature | Qty |
|---|---|---|---|
| 1 | 3054-204 | Pressure gauge guard | 1 |
| 2 | L073-503 | Screw, pan head, slotted, 6-32UNC x 3/8 in. long | 3 |
| 3 | 3702-318* | Rubber mat (mech.) | 1 |
| 4 | 3382-11 | Cable clamp | 1 |
| 5 | M006-503 | Screw, button head, socket, M5 x 25 mm long | 2 |
| 6 | M600-006 | Washer, plain, heavy, M5 | 2 |
| 7 | M501-205 | Nut, M5, nyloc, lock | 2 |
| 8 | L076-312 | Screw, fillister head, slotted, 1/4-28UNF x 4 in. long | 6 |
| 9 | 3702-210* | Mechanism cover | 1 |
| 10 | L076-009 | Screw, countersunk head, socket, 1/4-28UNF x 5/8 in. long | 6 |
| 11 | 3702-316 | Cable guard | 3 |
| 12 | L075-027 | Screw, countersunk head, socket, 10-32UNF x 3/8 in. long | 18 |
| 13 | 3702-317 | Cable guard plate | 3 |
| 14 | 3419-400A | Thumb screw | 6 |
| | 3702-905SP | Lifting handles kit, comprising | 1 |
| 15 | M501-008 | Nut, M5, nyloc, full | 30 |
| 16 | M600-006 | Washer, plain, heavy, M5 | 30 |
| 17 | 3702-458 | Backing plate | 6 |
| 18 | M006-106 | Screw, countersunk head, pozidrive, M5 x 20 mm long | 30 |
| 19 | J402-047 | Handle, 98-651, MSZN | 6 |
| 20 | 3702-211* | Chain cover | 2 |
| 21 | 3702-319* | Rubber mat | 2 |
| 22 | 3702-213 | Weight box | 2 |
| 23 | L075-021 | Screw, countersunk head, slotted, 10-32UNF x 1/2 in. long | 4 |
| 24 | 3702-461 | Weight storage lining / base | 4 |
| | 3442-2 | Mechanism housing (digital) | |

## Fig 6.15 Fulmar Pedestal - Composite Spare Parts

| Part No. | Nomenclature | Qty |
|---|---|---|
| 3702-900SP | Brake disc assembly, comprising: | |
| 3702-323 | Brake disc | 1 |
| 3702-326 | Brake pad | 1 |
| 3702-901SP | Friction shaft assembly, comprising: | |
| 3702-328 | Friction shaft | 1 |
| 3702-326 | Brake pad | 1 |
| 3702-902SP | Steering assembly - spares, comprising: | |
| Z200-029 | Nylon braided cord, Austin's A quality, size 6A | 18 in. |
| 3702-903SP | 3-strand pre-stretched Terylene cord, 1/4 in. dia, with crown knot | 28 in |
| 3702-904SP | 3-strand pre-stretched Terylene cord, 1/4 in. dia, with crown knot | 50 in. |
| 3702-905SP | Lifting handle kit, comprising: | |
| M501-008 | Nut, M5, nyloc, full | 30 |
| M600-006 | Washer, plain, heavy, M5 | 30 |
| 3702-458 | Backing plate | 6 |
| M006-106 | Screw, countersunk head, pozidrive, M5 x 20 mm long | 30 |
| J402-047 | Handle, 98-651, MSZN | 6 |
| 3702-906SP | Seal kit, comprising | |
| Q001-014 | 'O' ring, 3/4 in. ID x 0.07 in. sect | 3 |
| Q001-016 | 'O' ring, 3/8 in. ID x 3/32 in. section | 2 |
| Q001-030 | 'O' ring, 7/8 in. OD x 3/32 in. sect | 1 |
| Q001-038 | 'O' ring, 5/16 in. ID x 3/32 in. sect | 1 |
| Q200-004 | Bonded seal, Dowty PP-45-3 | 1 |
| Q200-008 | Bonded seal, Dowty PP-45-A | 1 |
| Q200-011 | Bonded seal, Dowty PP-45-B | 5 |
| Q900H006 | 'O' ring, 3/4 in. ID x 3/32 in. sect | 1 |
| Q900H007 | 'O' ring, R4081, 1 1/16 in. OD x 13/16 in. ID | 2 |

## Fig 6.15 Fulmar Pedestal - Composite Spare Parts (Cont)

| Part No. | Nomenclature | Qty |
|---|---|---|
| Q900H012 | 'O' ring, 1 7/8 in. ID x 1/8 in. sect | 1 |
| Q900H013 | 'O' ring, 1 1/2 in. ID x 1/8 in. sect | 1 |
| Q900H014 | 'O' ring, 2 in. ID x 1/8 in. sect | 1 |
| | | |
| 3702-910SP | Cover (mechanism) assembly, comprising: | |
| 3702-210 | Mechanism cover | 1 |
| 3702-318 | Rubber mat | 1 |
| | | |
| 3702-911SP | Cover (chain) assembly, comprising: | |
| 3702-211 | Chain cover | 1 |
| 3702-319 | Rubber mat | 1 |