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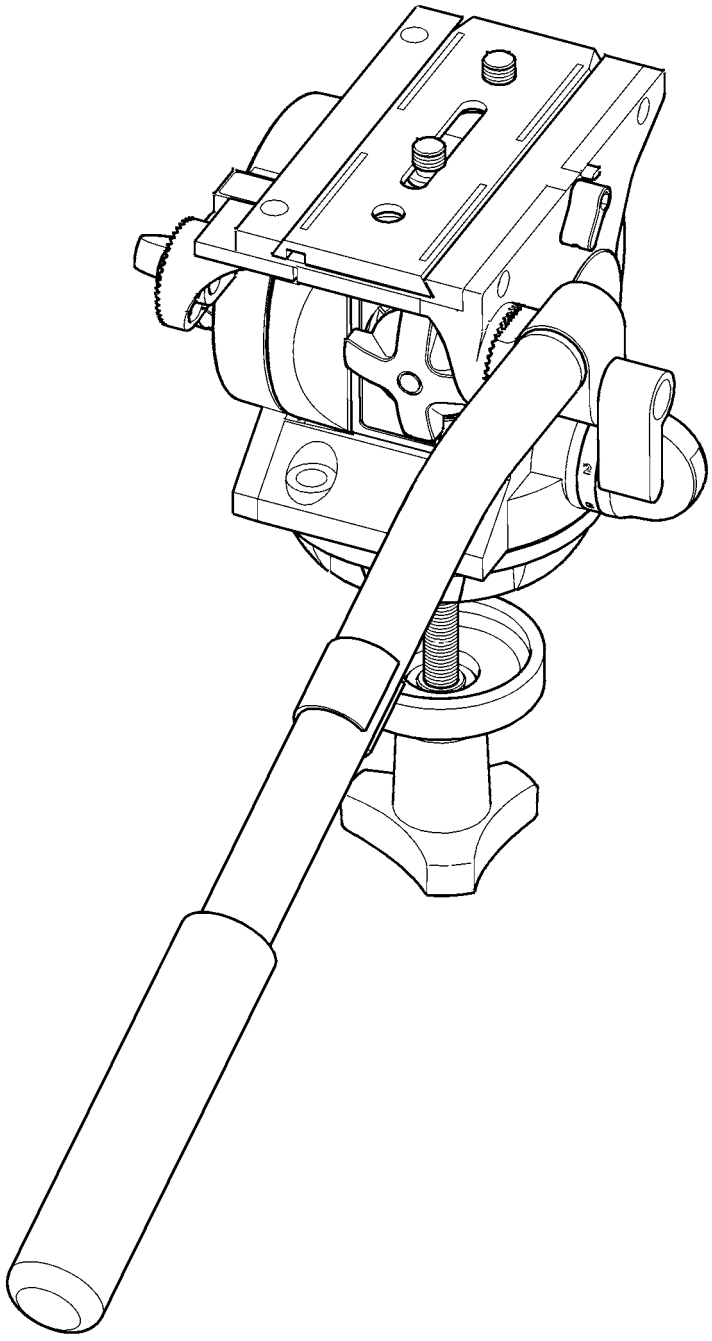
Maintenance Manual

Vision 5LF

Pan and Tilt Head



Vinten

Camera Control Solutions

Vision 5LF

PAN AND TILT HEAD
3395

MAINTENANCE MANUAL
AND
ILLUSTRATED PARTS LIST

PUBLICATION PART No. 3395-9

ISSUE 2

Foreword

This manual provides full and detailed maintenance and spare parts information for the Vinten® Vision® 5LF pan and tilt head.

WARNING!: Read the Safety Section on page 7 before using this pan and tilt head 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 pan and tilt head. Attention to the details contained herein will ensure that the pan and tilt head 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.

NOTE: Information contained in this document is subject to change.
Vinten Broadcast Ltd reserves the right, without notice, to make changes in equipment design or performance as progress in engineering, manufacturing or technology may warrant.

Notes to readers

This is the on-line version of ‘Vision5LF Pan and Tilt Head Maintenance Manual’ (3395-9). Readers should be aware that the pagination differs between on-line and printed versions.

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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Associated Publication

Vision LF Series Pan and Tilt Heads Operators Guide - Publication Part No. 3390-8

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 pan and tilt head or associated equipment, comments appear, highlighted by the word WARNING! and supported by the warning triangle symbol.

Critical data

Mass

Mass	6 lb(2.7 kg)

Load

Payload	4.5 kg - 10 kg(9.9 lb - 22 lb)

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

Weight	6 lb(2.7 kg)
Overall Dimensions:	
Height from top of tripod bowl	5.25 in.(133 mm)
Length	5.25 in.(133 mm)
Width	7 in.(18 0mm)
Load Capacity	See Graph, Fig 2.2
Tilt Range from Horizontal	+85° to -75°
Pan Range	360°
Horizontal Adjustment	4 in.(100 mm)
Pan Bar Length	15.5 in.(400 mm)
Camera Fixing	Removable sliding plate with two 3/8 in. BSW camera fixing screws
Optional Camera Fixing	Single 1/4 in. BSW fixing screw.

Design Improvements

Details	Serial No. Information
Improved seals in pan and tilt drag units	1288
Improvements to pan and tilt brakes	2945
Helicoil insert added for pan bar attachment	3026
Drag shoe profile changed	4852

Section 1

Introduction and Description

Contents **Para**

Introduction

1 The Vision 5LF pan and tilt head is part of a range designed for broadcast professional, corporate and educational use. It is largely constructed in aluminium alloy to produce a robust, lightweight unit. The unique counterbalance system enables a wide variety of camera/lens combinations to be maintained in perfect balance over the range of tilt movements. A maximum tilt angle of +85° to -75° is available at intermediate loadings, whilst at higher loadings the range of tilt motion is progressively reduced. A graph is provided in Section 2 which illustrates the relationship between load and centre-of-gravity (C of G) and may be used to ascertain the suitability of the head for any given combination of ENG camera/lens and accessories.

2 Drag is provided by the Vinten lubricated friction (LF) system which allows wide variation of the drag setting on both pan and tilt axes to suit operator preference, and permits “whip” movements to be executed, irrespective of drag setting. Pan and tilt movements are each provided with a brake.

Description

3 The Vision 5LF pan and tilt head embodies a spring counter-balancing mechanism, lubricated friction drag assemblies on the pan and tilt motions and a camera mounting plate.

4 The balance system is easily adjusted by a cruciform knob (2) on the rear face of the head. The control compensates for differing platform loads by varying the compressive force on the counter-balance spring.

5 Both the pan and tilt mechanisms incorporate LF drag systems to ensure smooth movement of the camera about these axes and are fitted with calibrated control knobs to adjust the drag setting. The pan drag control (8) is mounted on the right-hand side of the head and the tilt drag (11) on the left-hand side. The whip-pan facility is unaffected by the pan drag setting.

6 Friction brakes on each axis allow the head to be locked at any chosen position. The operating levers for both brakes (10)(12) are fitted on the left-hand side of the head.

7 A 100mm ball type base is supplied as standard, with a bowl clamp (7). An adaptor is available for conversion to a standard flat base. This adaptor permits mounting to a flat surface, either directly, via the tapped holes in the base, or via a Vinten Quickfix adaptor. Bases are not interchangeable.

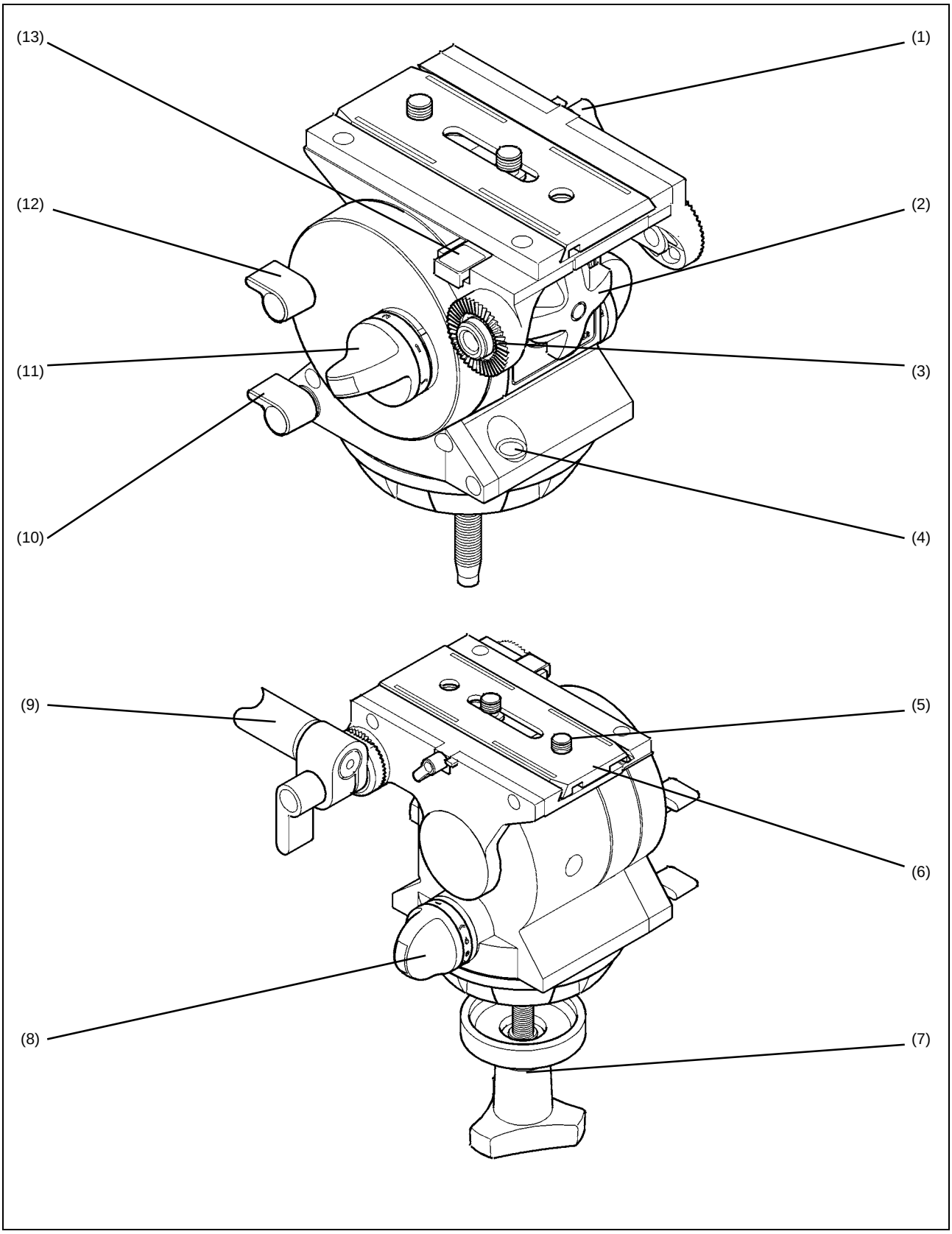


Fig 1.1 Vision 5LF Pan and Tilt Head

8 The camera mounting plate (6) is a sliding fit in the head, adjustable fore and aft by 50mm from its central position and is graduated along one edge to assist in repeat camera set up. A platform lock, operated by a rotary lever (1), is located on the right-hand side of the head for adjustment of the plate position. The head also has a release device (13) on the left-hand side, which allows removal of the camera and mounting plate complete. To remove the mounting plate, release the slide clamp and move the mounting plate fully rearwards. Operate the release by depressing it in the direction of its indicator arrow and holding. With the release depressed, the end stops which limit the mounting plate travel are disengaged, and the plate can be slid bodily from the head. This feature is an aid to rapid camera set-up.

9 Attachment points (3) for the pan bar are located at the rear of the head, on either side of the camera mounting platform. The pan bar (9) is fitted using a pan bar clamp, with angular adjustment available on the mount serrations. A second pan bar may be fitted. A level bubble (4) is fitted to the rear of the pan housing.

Section 2

Installation and Operation

Contents **Para**

General

1 To identify components, please refer to Fig 1.1. For further operating instructions, please refer to Vision LF Pan and Tilt Heads Operators Guide, Publication Part No. 3390-8.

Installing the head on a tripod

2 The Vision 5LF head is supplied with a 100 mm ball base and is designed for installation on a compatible Vinten Vision tripod.

3 Adaptors are available which enable the heads to be installed on tripods or pedestals fitted with other mountings.

4 To install the head, remove the bowl clamp assembly (7) from the head, position the head on the tripod and refit the bowl clamp assembly from below. Level the head with the aid of the level bubble (4) and tighten the bowl clamp.

Mounting the camera

5 Remove the slide plate (6) from the head by releasing the slide clamp (1), pressing the slide lock release (13) and pulling the plate to the rear.

6 Attach the slide plate to the camera or camera mounting plate under the approximate centre of the camera's weight using both fixing screws (5). Position the screws as far apart as possible.

7 Push the slide plate and camera into the track in the platform, ensuring slide release (13) snaps into position.

Mounting the camera (optional Quickfit adaptor)

8 To mount the camera using the optional Quickfit adaptor, proceed as follows (Fig 2.1):

8.1 If not already attached, secure the Quickfit adaptor (15) to the slide plate (6) with the two screws provided (5).

8.2 Free the Quickfit wedge (14) from the adaptor by simultaneously pushing in on the safety catch (17) and operating the wedge release (16).

8.3 Fit the Quickfit wedge to the camera with the two screws (18) provided.

8.4 Insert the forward end of the wedge into the forward end of the adaptor, pushing against the spring tension of the lock. Lower the rear of the wedge into the adaptor until an audible click indicates that the wedge is engaged with the adaptor.

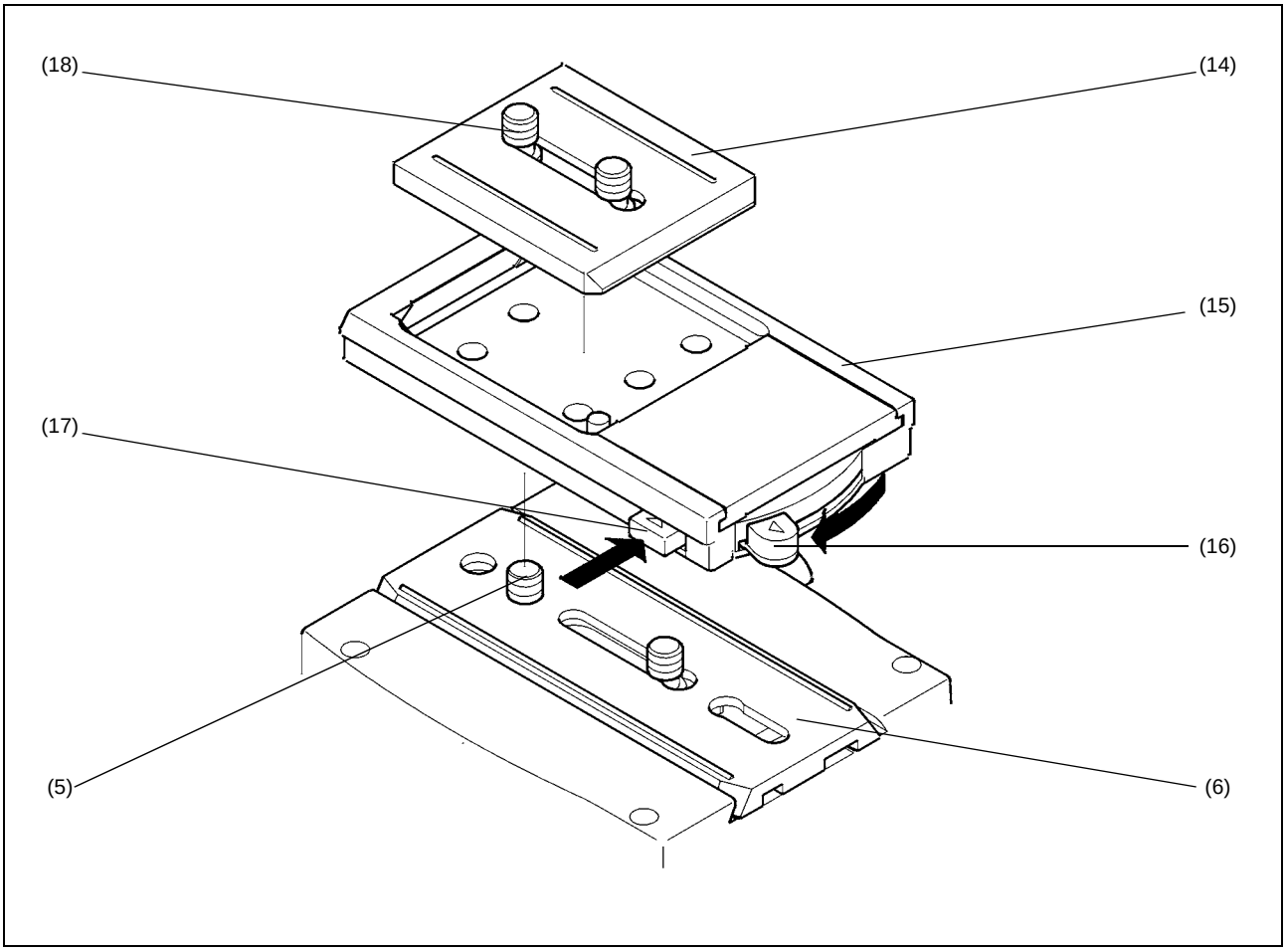


Fig 2.1 Optional Quickfit Adapter

Balancing the head

9 Balancing the Vision 5LF head achieves two objectives. Firstly, when a head is correctly balanced the operator will need a minimum amount of even effort to move the head. Secondly, once balanced, the head and its payload can be set to any tilt position and the head will maintain this position with “hands off”.

10 The graph (Fig 2.2) illustrates the relationship between load and centre-of-gravity (C of G) height and may be used to ascertain the suitability of the head for any given combination of camera, lens and accessories. The shaded area of the graph corresponds to those loads/C of G heights that can be balanced over the full tilt range. The areas to the right indicate the progressively reducing tilt range over which the head can balance higher loads.

11 Prior to balancing the head ensure that the pan bars and any ancillary equipment have been fitted in order to prevent upsetting the balance once it has been achieved.

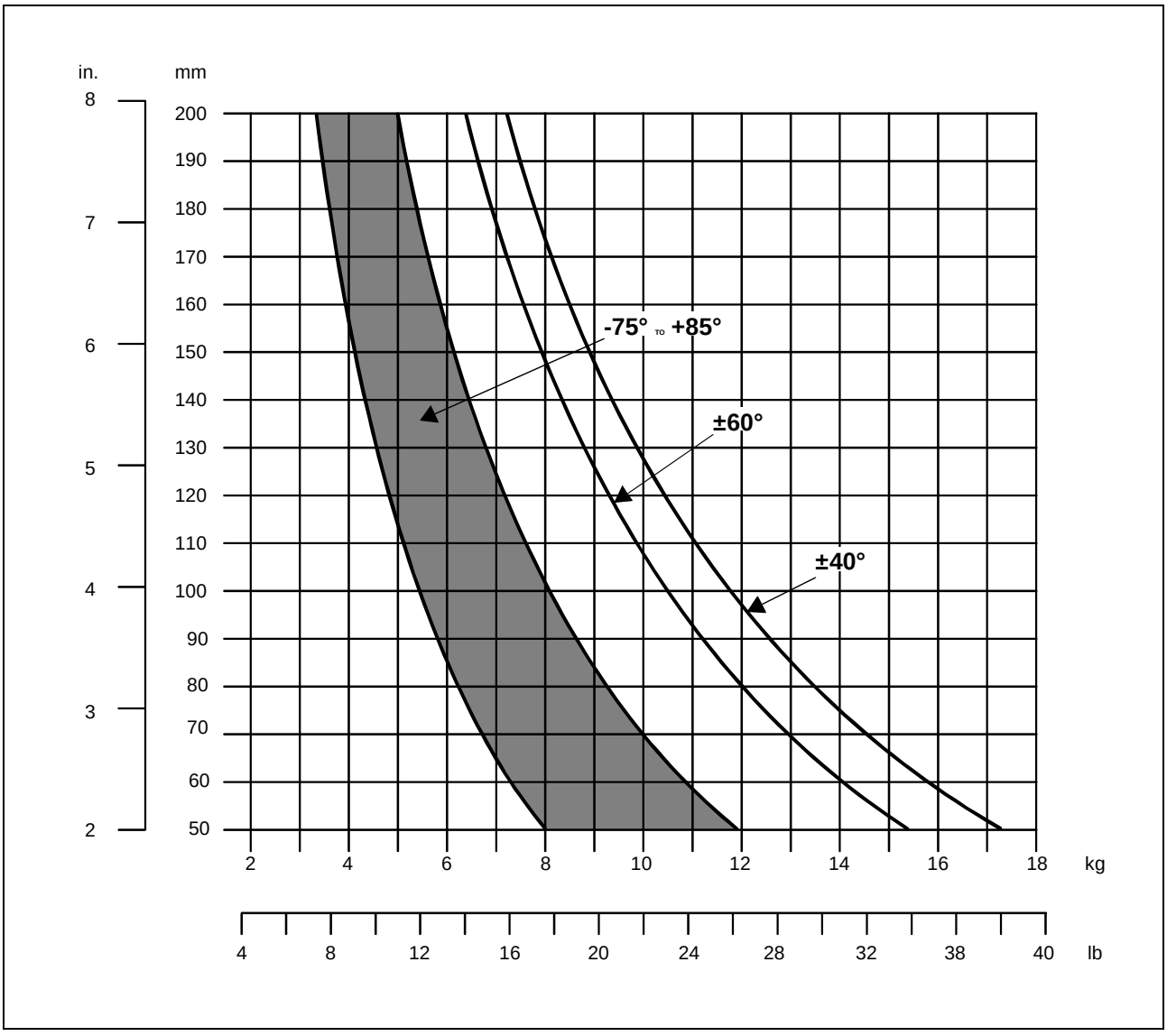


Fig 2.2 Balance graph

12 Balance the head as follows:

12.1 Release the tilt brake (12). Turn the balance knob (2) counter-clockwise until the head falls away from horizontal under the weight of the camera.

12.2 Release the slide clamp (1) and slide the camera backwards or forward until it balances horizontally. Apply the slide clamp (1).

12.3 Turn the balance knob (2) clockwise until the camera does not fall away when the head is tilted and released.

12.4 Repeat Para 12.2 and Para 12.3 until perfect balance is achieved, when the camera will remain set at any angle from +85° to –75° without falling away or springing back. Re-apply the tilt brake (12).

NOTE: Maximum tilt angle is less than +85° to –75° for heavy payloads with high C of G - see balance graph.

Pan and tilt brakes

13 Friction brakes on each axis allow the head to be locked at any chosen position. The operating levers for the pan brake (10) and tilt brake (12) are fitted at the left-hand side of the head.

14 To apply the brake, turn the lever fully clockwise. To release the brake, turn the lever fully counter-clockwise.

Pan and tilt drag

15 Both the pan and tilt mechanisms incorporate the Vinten liquid friction (LF) system to ensure smooth movement of the camera about these axes and are fitted with control knobs to adjust the drag setting.

16 The tilt drag adjustment knob (11) is on the left-hand side of the head, the pan drag knob (8) is on the right-hand side. To increase drag, turn the knob clockwise, towards a higher graduation. To decrease drag, turn the knob anti-clockwise, towards a lower graduation.The whip-pan facility is unaffected by the pan drag setting.

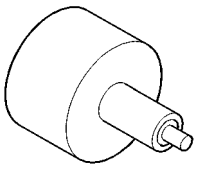
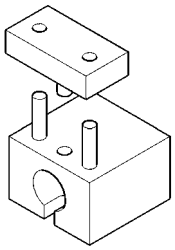
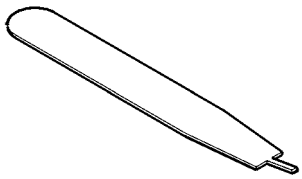
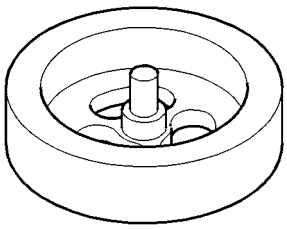
Section 3

Tools and Materials

General

1 The following special tools and consumable materials will be required for servicing, disassembly, assembly and adjustment.

Special tools

Item		Part No.	Procedure
	Bearing press tool	3431-911TL	Installing needle bearing in actuator shaft
	Pin press	3431-912TL	Installing dowel pin to connect actuator shaft and adjustment slide
	Spring insertion tool	3390-909TL	Assembly of platform
	Centralizing fixture (pan)	3390-904TL	Centralizing pan drag shoe
	Centralizing fixture (tilt)	3395-906TL	Centralizing tilt drag shoe

Consumable materials

NOTE: Adhesives and lubricants are not supplied by Vinten Broadcast Ltd and should be obtained under local arrangements.

ITEM	PART No.	USE
Grease GP50 Moly-Paul	Z150-081	Spring actuator other moving contact surfaces EXCEPT drag faces
Grease Molytrace LT Moly-Paul	Z150-090	Rolling bearings and shims
Grease M240G Rocol	Z150-072	Adjustment threads
Grease white bearing	Z150-085	Bearing lubrication
Grease, bearing, Castrol LM	Z150-123	Bearing lubrication
Vinten Fluid No. 3	3051-25	Drag housings
Loctite primer T	Z002-019	Pan drag centre screw and shaft threads
Loctite 221	Z002-026	Balance unit preload screw
Loctite 222E	Z002-075	Thread locking
Loctite 241	Z002-022	Pan drag shaft thread
Loctite 270	Z002-034	Drag adjustment knobs
Loctite 380	Z002-078	Slide plate rubbers
Loctite IS 495	Z002-059	Balance spring buffer
Loctite 601	Z002-020	Balance adjustment linkage
Loctite 641	Z002-074	Tilt bearing installation
Silcoset 153	Z002-036	Level bubble installation

Section 4

Servicing

Contents **Para**

General

1 The Vision 5LF head requires a minimum of periodic servicing. Its rotational and drag mechanisms are totally enclosed to prevent the ingress of dirt or foreign bodies. If the head becomes faulty reference should be made to Section 5 of this manual, or the unit may be returned to Vinten Broadcast Limited or your local distributor for overhaul.

Cleaning

2 During indoor use, the only cleaning required should be a regular wipe over with a lint-free cloth. Dirt accumulated during storage may be removed using a semi-stiff brush. Particular attention should be paid to the levelling ball and mounting face of the head and to the space between the tilting assembly and the base.

3 The Vision 5LF head is weatherproof. However, use out-of-doors under adverse conditions will require special attention. Salt spray should be washed off with fresh water at the earliest opportunity. Sand and dirt acts as an abrasive and should be removed using a semi-stiff brush or vacuum cleaner

NOTE: 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.

Lubrication

4 The bearings in the pan and tilt head are packed with grease. Under normal operating conditions they will only require re-greasing if there is any harshness or stiffness in movement. Refer to Section 5 to dismantle the head for re-greasing.

5 To check the bearings, turn the balance control as far as possible counter-clockwise, turn the pan and tilt drag controls fully counter-clockwise and release the brakes. At these settings both pan and tilt axes should move smoothly and without perceptible drag.

Adjustments

Drag control knob adjustment

6 The pan and tilt drag controls on the Vision 5LF head operate by expanding a drag shoe with an actuator. Bedding-in occurs between the actuator and the shoe, which requires resetting of the drag control knob. This simple adjustment should be performed after one month's service and at six monthly intervals thereafter.

7 The procedure for resetting the pan and tilt drag control knob is as follows (Fig 4.1):

7.1 Release the pan and tilt brakes.

7.2 Prise out the centre of the appropriate drag control knob (3).

7.3 Turn the knob fully clockwise to its maximum setting and remove the retaining screw (2).

7.4 Pull off the knob (1), rotate approximately 20 degrees counter-clockwise and refit.

7.5 Turn the knob fully counter clockwise to its minimum setting.

7.6 Turn knob clockwise and ensure that drag begins to be felt at a setting between 1 and 1.5 on the drag knob. Repeat Para 7.4 until this can be achieved.

7.7 Secure knob with screw (2) and refit knob centre (3).

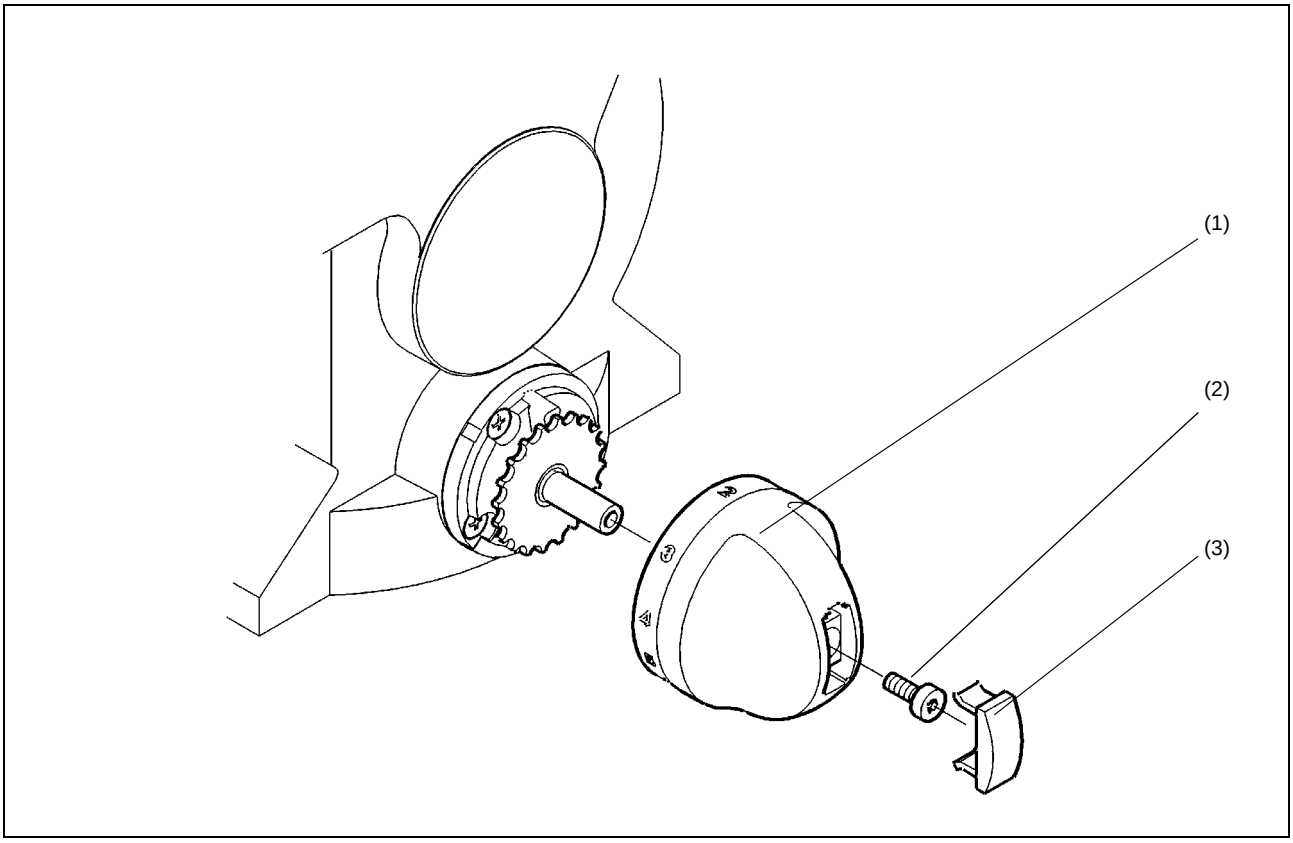


Fig 4.1 Drag control knob adjustment

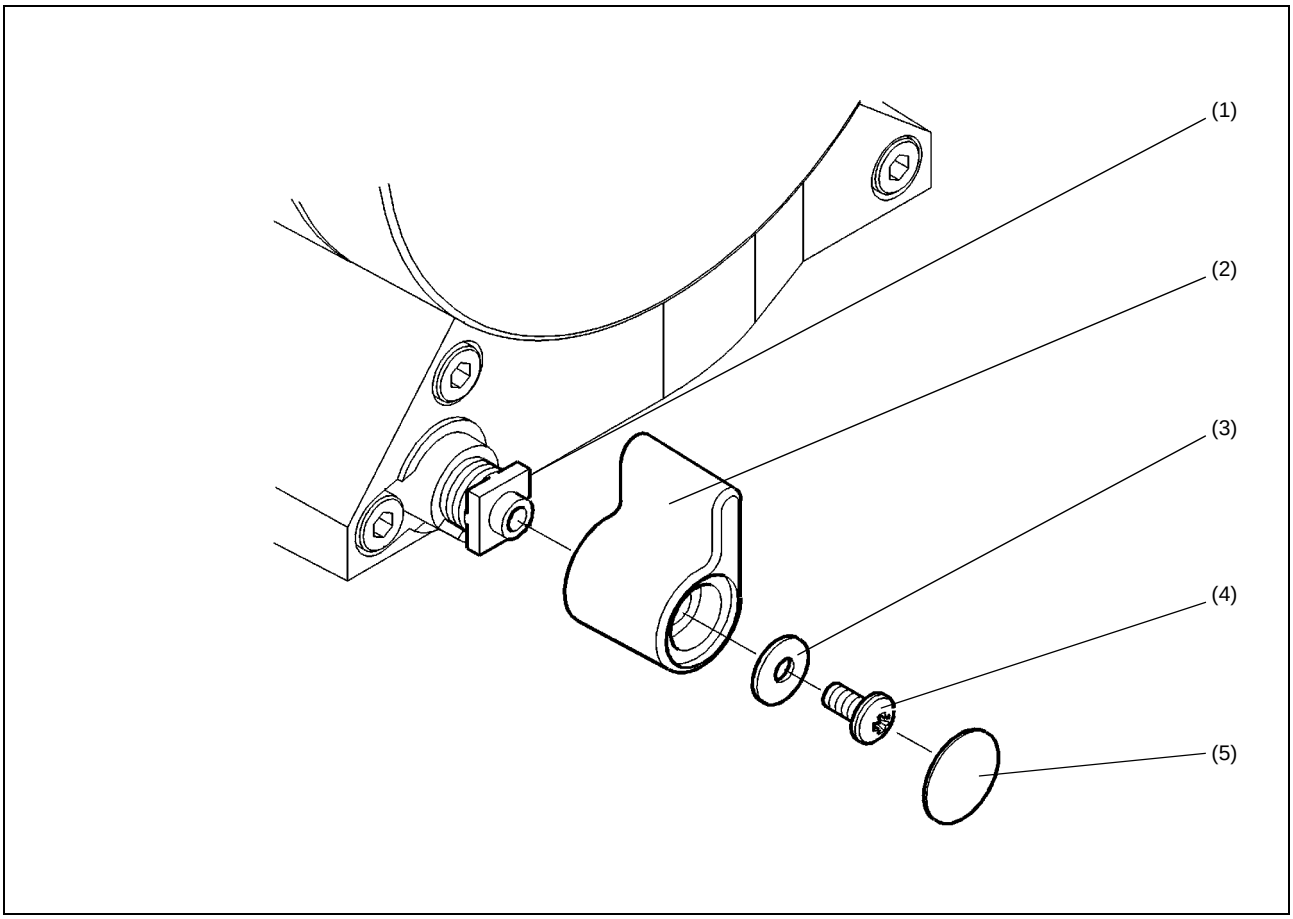


Fig 4.2 Brake knob adjustment

Brake knob adjustment

8 The pan and tilt brakes are set during manufacture so that, when the brakes are fully applied, the knob is vertical. As the brakes bed in during use it may be necessary to reset the knobs to this position.

9 The procedure for resetting the pan and tilt brake knobs is as follows (Fig 4.2):

9.1 Prise out the centre of the appropriate brake knob (5).

9.2 Turn the knob (2) clockwise to fully apply the brake.

9.3 Remove the screw (3) and washer (4) and pull the knob (2) off the shaft (1).

9.4 Refit the knob on the shaft in the vertical position.

9.5 Turn the knob fully counter-clockwise and ensure the brake is released.

9.6 Turn the knob clockwise and ensure that the brake is fully applied when the knob is vertical. Adjust the position of the knob if necessary.

9.7 Secure the knob with the screw (3) and washer (4). Refit the knob centre (4), using Silcoset 153.

Section 5

Repair

Contents Para

General

1 This section details procedures for disassembly and assembly of the Vision 5LF head, where such operations are not self-evident. Reference is made in the procedures to figures in the Illustrated Parts List.

2 The head is constructed from precision components, many of which are of aluminium alloy. Several of the assembly procedures require the use of special tools and specific sealants, adhesives or lubricants. It is advised that only experienced and properly equipped personnel with access to all necessary tools and materials should attempt to overhaul, repair or replace components on these heads. The tools and consumable materials required for work on Vision 5LF heads are listed in Section 3.

Disassembly

Platform

3 To remove the platform, proceed as follows (Fig 6.2):

3.1 Remove the platform slide (Section 2).

3.2 Remove two screws (8) and two screws (23), noting that screws are secured with Loctite. Carefully lift the LH side of the platform and retain the platform slide release spring (28) which will be released as the platform is lifted.

3.3 Turn the platform slide clamp lever (4) upwards and separate the platform from RH side plate (7). Collect the slide clamp strip (11) as it is released.

3.4 Remove the platform slide release (26) by feeding it up through the platform.

3.5 If required, unscrew and remove slide clamp screw (3). Unscrew grub screw (5) and remove slide clamp lever (4).

Tilt mechanism

4 To remove the tilt mechanism, proceed as follows (Fig 6.2):

4.1 Remove the platform (Para 3).

WARNING!: Ensure that balance knob is turned fully counter-clockwise before removing the tilt mechanism.

4.2 Remove two screws (23) and two screws (25), noting that screws are secured with Loctite.

NOTE: When the tilt mechanism is pulled off the head the balance mechanism will be under spring tension.

4.3 Pull the tilt mechanism off the head. Retain shims (9) and shims (29).

4.4 It is not necessary to remove the mechanism housing cover (22) from the mechanism housing assembly (17) unless replacement of the bearing (11) or access to the balance mechanism or RH side plate is required. The cover is secured by three screws (7). The bearing (11) is a press fit in the housing and is secured with Loctite. Heat the housing to 80°C to facilitate removal.

5 To dismantle the tilt mechanism, proceed as follows (Fig 6.3):

NOTE: This unit contains Vinten Fluid No. 3. A good supply of clean rag should be to hand.

5.1 Remove the tilt drag knob cap (23). Remove the screw (24) and pull off the tilt drag knob (25).

5.2 Remove three screws (26) securing tilt drag knob retainer (27). Remove the retainer, the tilt drag knob boss (11) (complete with drag knob retaining shaft (14)) and the two thrust washers and the thrust race (10), noting orientation of components for assembly. The drag knob retaining shaft (14) is secured in the tilt drag knob boss (11) with Loctite.

5.3 On the pan and tilt brakes, prise off the covers (19), remove the screws (18) and washers (17) and pull off the knobs (16). Unscrew the two brake shafts (20 and 25), noting their orientation.

NOTE: Early brake shafts (to Serial No. 2945) are solid. Later brake shafts are fitted with spring and friction elements (21 and 22) to improve performance. Early brake shafts should be replaced by later brake shafts and spring and friction elements.

5.4 Remove six screws (1) which secure the tilt drag cover/brake disc assembly (30) to the tilt drag housing (2). Separate the cover and housing, remembering that a quantity of Vinten Fluid No. 3 is contained in the housing. Discard 'O' ring (31).

NOTE: The design of the tilt drag cover/brake disc assembly changed from Serial No. 1288. Ensure correct housing and 'O' ring are replaced.

5.5 Remove two screws (35) securing drag shoe assembly (34). Remove drag shoe assembly, drag actuator shaft (3), washer (4) and 'O' ring (5). Discard 'O' ring.

5.6 Turn the tilt drag cover/brake disc assembly (30) so that the cut-out in the brake disc aligns with the tilt brake plate (28). Pull the assembly off the tilt bearing housing (32). Note the orientation of the omniseal (8), with the open side facing towards the drag shoe. Remove and discard the omniseal.

5.7 Remove screw (6) and two screws (33) securing tilt bearing housing (30) to outrigger (9). Remove and discard 'O' ring (5). Remove bearing (7).

5.8 Remove four screws (29) securing tilt brake plate (28) to outrigger (9).

5.9 Pull out pan brake pivot (13) and remove pan brake shoe assembly (12).

Balance mechanism

WARNING!: The balance mechanism spring tension is preset. Do not remove or dismantle the balance mechanism unless necessary.

6 To remove the balance mechanism, proceed as follows (Fig 6.2):

6.1 Remove the platform (Para 3).

6.2 Remove the tilt mechanism and mechanism housing cover (Para 4).

6.3 Remove needle roller (16).

6.4 Using circlip pliers, remove Spirol ring (15) from groove in mechanism housing assembly (17) and allow it to rest on the neck of the balance knob assembly (14).

6.5 Unscrew and remove the balance knob assembly (14) together with Spirol ring (15).

6.6 Remove the thrust race and two thrust washers (13), noting orientation of components for assembly.

6.7 Remove cap (36) from mechanism housing assembly (17) to gain access to balance mechanism screw (35)

6.8 Undo screw (35) until balance mechanism tension is just relieved.

6.9 Using circlip pliers, release circlip (12) securing RH side plate (7) in mechanism housing assembly. Carefully pull RH side plate out of mechanism housing assembly. Retain shim (9) and shims (29).

6.10 Undo screw (35) as far as possible without separating from actuator shaft (31).

6.11 Manoeuvre balance mechanism out of mechanism housing assembly. Ensure all shims (29) and circlip (12) are removed from mechanism housing assembly.

6.12 The balance mechanism may now be dismantled if required. Do not remove pins from spring actuator (30).

Pan mechanism

7 To remove/dismantle the pan mechanism proceed as follows (Fig 6.4):

NOTE: This unit contains Vinten Fluid No. 3. A good supply of clean rag should be to hand.

7.1 Remove the platform (Para 3).

7.2 Remove the tilt mechanism and mechanism housing cover (Para 4).

7.3 Remove the balance mechanism (Para 6).

7.4 Remove the pan drag knob cap (3). Remove the screw (4) and pull off the pan drag knob (5).

7.5 Remove three screws (2) securing pan drag knob retainer (1). Remove the retainer and unscrew and remove the pan drag shaft (7). The pan drag knob boss (6) is secured to the shaft with Loctite.

7.6 Slacken the pan drag lever screw (32) and lift the pan drag lever (33) and clevis (34) off the drag actuator (21). Remove actuator shim (29).

7.7 If required, drive out dowel pin (30) to separate lever (33) and clevis (34). Discard self-locking ring (31).

7.8 Remove screw (12) and washer (13) from end of bowl clamp stud (27)

7.9 Remove six screws (25) which secure the spherical base (24) to pan drag top plate (19). Gently ease the base away from the top plate. When the base is removed it will contain most of the Vinten Fluid No. 3. The bowl clamp stud (27) is secured to the base using Loctite. Remove and discard ‘O’ ring (23).

NOTE: The design of the pan drag top plate and spherical base changed from Serial No. 1288. Ensure correct top plate, spherical base and ‘O’ ring are replaced.

7.10 Remove two screws (26) securing drag shoe assembly (22). Remove drag shoe assembly and the pan drag actuator (21). Remove and discard ‘O’ ring (17).

7.11 Remove pan drag top plate (19) and the thrust race and two thrust washers (18), noting orientation of components for assembly. Note the orientation of omniseal (20), with the open side facing towards the spherical base. Remove and discard the omniseal.

7.12 Remove two screws (28) securing pan bearing housing (15) to mechanism housing assembly (10). Remove and discard ‘O’ ring (16) from groove in pan bearing housing.

7.13 If required, remove bearing (14) from mechanism housing assembly. The bearing is secured with Loctite.

Mechanism housing assembly

8 If required, the bearing (Fig 6.2, item 11) may be removed from mechanism housing assembly. The bearing is a press fit and is secured with Loctite.

Assembly

NOTE: It is important for correct operation of the head that torque settings, where given, are achieved.

Mechanism housing assembly

9 If the bearing (Fig 6.2, item 11) has been removed from mechanism housing assembly a replacement may be installed without heating the housing. It is essential that a suitable press, fitted with a mandrel adaptor and support ring to match the bearing, is used. Proceed as follows:

9.1 Remove all traces of adhesive from bearing and seating in mechanism housing assembly. Degrease bearing seating and outer race of bearing.

9.2 Apply Loctite 641 to outer race of bearing and press into mechanism housing assembly, ensuring bearing is correctly seated.

Pan mechanism

10 Assemble the pan mechanism as follows (Fig 6.4):

10.1 Lightly lubricate components as follows:

10.1.1 All moving surfaces, particularly ‘O’ rings and seals (9, 16, 17 and 20), pan drag actuator (21), pan drag actuator lever (33), actuator shim (29) and bearings (8, 14 and 18) using white bearing grease. This grease must not be allowed to come into contact with the drag surfaces.

10.1.2 Threads of pan drag shaft (7) and clevis (37) with Rocol M204G grease.

10.1.3 Contact surfaces of drag shoe (22) and bearing housing (15), except for the area around clamping screws (26), with grease GP50. This grease must not be allowed to come into contact with the drag surfaces.

10.2 The correct orientation of the omniseal (20), as shown in Fig 6.4 is important. Renew the seal.

10.3 Fit new ‘O’ rings and seals throughout.

10.4 Prior to assembly fill the base (15) with 12.50cc of Vinten Fluid No. 3 (Section 3).

10.5 Assemble dowel pin (30), pan drag actuator lever (33), pan drag actuator clevis (34) as noted on disassembly. Secure with self-locking ring (31).

10.6 Degrease threads of lever (33) and screw (32) and prime with Loctite primer N.

10.7 Assemble the thrust race and two thrust washers (8) on drag shaft (7) (complete with pan drag knob boss (6)), observing correct orientation. Install 'O' ring (9) on drag shaft (7).

10.8 Install assembled drag shaft in mechanism housing (10) and secure with drag knob retainer stop (1) and three screws (2).

10.9 Screw assemble clevis (34) on to drag shaft (7).

NOTE: The design of the pan drag top plate and spherical base changed from Serial No. 1288. Ensure correct top plate, spherical base and 'O' ring are replaced.

10.10 Install 'O' ring (16) in pan bearing housing (15). Install bearing (14) in pan bearing housing and secure with Loctite 641.

10.11 Install omniseal (20) in pan drag top plate (19), observing correct orientation.

10.12 Install the thrust race and two thrust washers (18) in pan drag top plate (19), observing correct orientation.

10.13 Position pan drag top plate and assemble components over the pan bearing housing (15).

10.14 Install 'O' ring (17) on drag actuator (21). Position actuator in drag shoe assembly (22) and install both on the pan bearing housing (15). Secure temporarily with two screws (26).

10.15 Install assembly in centralizing fixture (3390-904TL).

10.16 Screw in pan drag shaft (6) to expand drag shoe assembly.

10.17 Remove screws (26) one at a time and re-install using Loctite 221. Torque-tighten screws to 5.08Nm (45lbf in.).

10.18 Remove three screws (2), drag knob retainer stop (1), pan drag shaft (6) and pan drag lever (27).

10.19 Remove assembly from centralizing fixture.

10.20 Install 'O' ring (23) in spherical base (24).

10.21 Prime six screws (25) with Loctite N primer and allow to dry.

10.22 Position spherical base over drag shoe assembly and secure with six screws (25), using Loctite 222E.

10.23 Prime screw (12) with Loctite T primer and allow to dry.

10.24 Install screw (12) and washer (13) in clamp stud (27) using Loctite 241. Tighten screw (12) down hard to bed in parts, then slacken and torque-tighten to 0.56Nm (5lbf in.).

10.25 Install actuator shim (29) and pan drag lever (33) on drag actuator (21).

10.26 Prime screw (32) with Loctite N primer and allow to dry.

10.27 Secure pan drag lever (33) with screw (32), using Loctite 222E.

10.28 Screw in pan drag shaft (7)(complete with pan drag knob boss (8)).

10.29 Install drag knob retainer/stop (1) on mechanism housing and secure with three screws (2.)

10.30 Turn the pan drag knob boss (8) clockwise until any slack is taken up, then turn the mechanism housing in both directions to confirm that movement is smooth and quiet. Degrease thread in pan drag shaft (7).

10.31 Install pan drag knob (5) on pan drag shaft (7), with '0' aligned with the index mark on mechanism housing. Secure with screw (4), but do not tighten.

10.32 Adjust the pan drag knob (See "Drag control knob adjustment" on page 21.) after assembly of the head.

Tilt mechanism

11 Assemble the tilt mechanism as follows (Fig 6.3):

11.1 Lightly lubricate components as follows:

11.1.1 All moving surfaces, particularly 'O' rings and seals (5, 8 and 31), drag actuator (3) and bearing (7) using white bearing grease. This grease must not be allowed to come into contact with the drag surfaces.

11.1.2 Contact surfaces of drag shoe (34) and bearing housing (32), except for the area around clamping screws (35), with grease GP50. This grease must not be allowed to come into contact with the drag surfaces.

11.2 The correct orientation of the omniseal (8), as shown in Fig 6.3 is important. Renew the seal.

11.3 Fit new 'O' rings and seals throughout.

11.4 Install omniseal (8) in the tilt drag cover/brake disc assembly (30), observing correct orientation.

11.5 Fill the tilt drag housing (2) with 14.75cc of Vinten Fluid No. 3 (See "Consumable materials" on page 19.).

11.6 Install bearing (7) in outrigger (9).

11.7 Degrease and prime two screws (33) and one screw (6) with Loctite N primer and allow to dry.

11.8 Install 'O' ring (5) in tilt bearing housing (32) and secure to outrigger (9) with two screws (33) and one screw (6) and Loctite 222E.

11.9 Degrease and prime four screws (29) with Loctite N primer and allow to dry.

11.10 Install tilt brake plate (28) on outrigger (9) and secure with four screws (29) and Loctite 222E.

11.11 Align cutout in tilt drag cover/brake disc assembly (30) with tilt brake plate (28) and push the assembly onto the tilt bearing housing (32). Take care not to damage the omniseal (8).

11.12 Install 'O' ring (5) and washer (4) in the tilt bearing housing (32).

11.13 Install drag shoe assembly (34) on the tilt bearing housing (32). Secure temporarily with two screws (35).

11.14 Install drag actuator shaft (3).

11.15 Install assembly in centralizing fixture (3395-906TL).

11.16 Using the fixture, expand the drag shoe assembly.

11.17 Remove screws (35) one at a time and re-install using Loctite 221 on threads and Loctite 601 under heads. Torque-tighten screws to 7.34Nm (65lbf in.).

11.18 Remove from fixture.

NOTE: The design of the tilt drag cover/brake disc assembly changed from Serial No. 1288. Ensure correct housing and 'O' ring are replaced.

11.19 Install 'O' ring (31) in tilt drag cover/brake disc assembly (30).

11.20 Degrease and prime six screws (1) with Loctite N primer and allow to dry.

11.21 Install completed outrigger assembly on tilt drag housing (2). Align fixing holes and secure with six screws (1) and Loctite 222E.

11.22 Install pan brake pivot (13) in pan brake shoe assembly (12) and install in tilt mechanism.

11.23 The remaining tilt mechanism components are installed after assembly of the balance mechanism.

Balance mechanism

12 Assemble/install the balance mechanism as follows (Fig 6.2):

12.1 If the bearing (11) has been removed from the mechanism housing cover (22) a replacement may be installed without heating the cover. It is essential that a suitable press, fitted with a mandrel adaptor and support ring to match the bearing, is used. Proceed as follows:

12.1.1 Remove all traces of adhesive from bearing and seating in mechanism housing cover. Degrease bearing seating and outer race of bearing.

12.1.2 Apply Loctite 641 to outer race of bearing and press into mechanism housing cover, ensuring bearing is correctly seated.

12.2 Assemble the pan mechanism (Para 10)

12.3 Assemble the tilt mechanism (Para 11).

12.4 Using Loctite 495, adhere buffer (33) to end washer (34).

12.5 Lightly lubricate components as follows:

12.5.1 All moving contact surfaces of the balance mechanism with grease GP50.

12.5.2 All bearings and shims with white bearing grease.

12.6 Install bearing shim (9) on RH side plate (7) and install in mechanism housing (17). Secure with circlip (12).

12.7 Fit equal numbers of shim washers (20) on each side of bearing (19) to minimise side play between the adjustment slide (18) and actuator shaft (31).

12.8 Using tool 3431-912TL, secure dowel (21) in adjustment slide (18) using Loctite 601.

12.9 Assemble spring actuator (30), spring (32), end washer (34) and screw (35).

12.10 Install two shim washers (29) on spring actuator (30).

12.11 Position the assembled spring actuator in the mechanism housing (17), ensuring spring actuator (30) engages with needle bearing in RH side plate (7).

12.12 Apply Loctite 221 to the thread in the actuator shaft (31) and push the assembled adjustment slide (17) and actuator shaft into the mechanism housing (17) from the outside, so that the slot in the adjustment slide (17) aligns with the hole in the mechanism housing.

12.13 Lubricate the thrust washer components (13) with white bearing grease and install in mechanism housing (17), ensuring orientation is as noted during disassembly.

12.14 Lubricate the shaft of the balance knob assembly (14) with M204G grease and screw into the adjustment slide (18). Secure balance knob with Spirol ring (15).

12.15 Screw in the balance knob until needle roller (16) can be pushed fully home.

12.16 . Apply Silcoset 153 around lower edges of mechanism housing cover (22) and install mechanism housing cover (22) on mechanism housing (17). Secure with three screws (7).

12.17 Before installing the tilt mechanism, degrease the pan brake contact surface on the pan drag top plate (Fig 6.4, item 19.)

12.18 Install bearing shim (9) on tilt mechanism (24).

12.19 Install tilt mechanism (24) in mechanism housing (17), ensuring spring actuator (30) engages with needle bearing. Secure with two screws (23) and two screws (25), using Loctite 222E.

12.20 Working through the hole in the mechanism housing assembly (17), fully tighten the balance mechanism screw (37).

12.21 Using Loctite, install cap (36) in hole in the mechanism housing assembly (17).

13 Install the remaining tilt mechanism components as follows (Fig 6.3):

NOTE: Early brake shafts (to Serial No. 2945) are solid. Later brake shafts are fitted with spring and friction elements (21 and 22) to improve performance. Early brake shafts should be replaced by later brake shafts and spring and friction elements.

13.1 Install spring element (21) and friction element (22) in pan brake shaft (20) and screw into outrigger (9).

13.2 Install spring element (21) and friction element (22) in tilt brake shaft (25) and screw into outrigger (9).

13.3 Screw both brake shafts in as far as they will go and install a brake knob (16) on each shaft so that, when fully applied the knob is vertical and, when turned fully counter-clockwise, the brake is off.

Secure each knob with a screw (18) and washer (17) with Loctite 222E. Secure cap (19) to each knob with Silcoset.

13.4 Lubricate the thrust washer components (10) with white bearing grease and install in outrigger (9), ensuring orientation is as noted during disassembly.

13.5 Lubricate the tilt drag knob boss (11) with M204G grease and install, complete with drag knob retaining shaft (14), in the thrust bearing (10). Secure with tilt drag retainer/stop (27) and three screws (26).

13.6 Turn the tilt drag boss (11) clockwise until any slack is taken up, then turn the outrigger in both directions to confirm that movement is smooth and quiet. Degrease thread in drag knob retaining shaft (14).

13.7 Install tilt drag knob (15) on drag knob retaining shaft (14), with '0' aligned with the index mark on outrigger. Secure with screw (24), but do not tighten.

14 Adjust the tilt drag knob (See "Drag control knob adjustment" on page 21.) after assembly of the head.

Platform

15 To install the platform, proceed as follows (Fig 6.2):

15.1 If removed, install dowel pin (40) in platform (39) to leave the end projecting 3.5mm. Loctite 601 may be used to secure the dowel pin if required.

15.2 Degrease two threaded holes in the top face of tilt housing (24), two threaded holes in the edge of platform (39), two screws (23) and two screws (8).

15.3 Support the head securely in an upright position and set the top surfaces of the tilt drag housing and the RH side plate approximately level.

15.4 Locate slide clamp strip (10) in the slot in the underside of the platform and hold it in position using the rounded end of tool 3390-909TL inserted from the top face of the platform. Insert slide release (26) downwards through the hole in the platform to locate in the underside of the platform. Ensure that the slide release is free to move and is inserted with its slot towards the centre of the platform.

15.5 Holding the slide release in the fully out position, tilt the RH edge of the platform down and engage the lug on the side of the platform in the notch in the RH side plate. Lower the LH side of the platform into position on the top face of the tilt unit housing, ensuring that the lugs on the underside of the platform enter the corresponding slots in the top face of the tilt unit housing and the 2mm dia Spirol pin in the top of the tilt unit housing enters the slot in the slide release. Remove tool 3390-909TL.

15.6 Position spring (28) on the cylindrical end of tool 3390-909TL. Holding the tool so that the cylindrical end points slightly downward, lift the LH side of the platform just enough to allow the spring to be introduced between the top face of the slide release and the underside of the platform. Use the tool to guide the free end of the spring into the slot in the slide release, compress the spring against the 2mm dia Spirol pin until its outer end drops into the slot in the slide release, lower the platform to rest on the tool and withdraw the tool.

15.7 Apply Loctite 222E to two screws (23) and two screws (8) and secure the platform to the RH side plate and the tilt unit housing.

15.8 Confirm that the slide release operates freely and that the spring returns it to the outward position.

15.9 Insert platform slide (1) into the rear end of the platform dovetails, check that it is retained at the front end by the dowel pin and at the back end by the slide release.

15.10 Apply white bearing grease to the threads of clamp screw (3) and screw it into the lug on the RH side of the platform to clamp the platform slide.

15.11 Degrease grub screw (5), apply Loctite 222E to the threads and install in knob (4). Fit knob (4) on the hexagonal part of clamp screw (3) so that the platform slide is clamped when the arm points vertically downwards and is free when the knob is turned counter-clockwise to the stop. Tighten grub screw (5) to secure the knob.

Section 6

Illustrated Parts List

Contents Para

Illustrations Page

Introduction

1 This parts list is issued for the Vision 5LF pan and tilt head, manufactured by Vinten Broadcast Limited, Western Way, Bury St. Edmunds, Suffolk, IP33 3TB, England.

Ordering spare parts

2 Always quote the head 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 6.6 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.
Vision 5LF pan and tilt head	3395-3
Pan bar and clamp	3219-26
Bowl clamp knob assembly	3390-18
Camera mounting plate for Vision 5LF pan and tilt head	3325-901SP
ENG Quickfit automatic adaptor (c/w one wedge plate)	3371-3
Additional wedge plate for ENG Quickfit automatic adaptor	3763-11

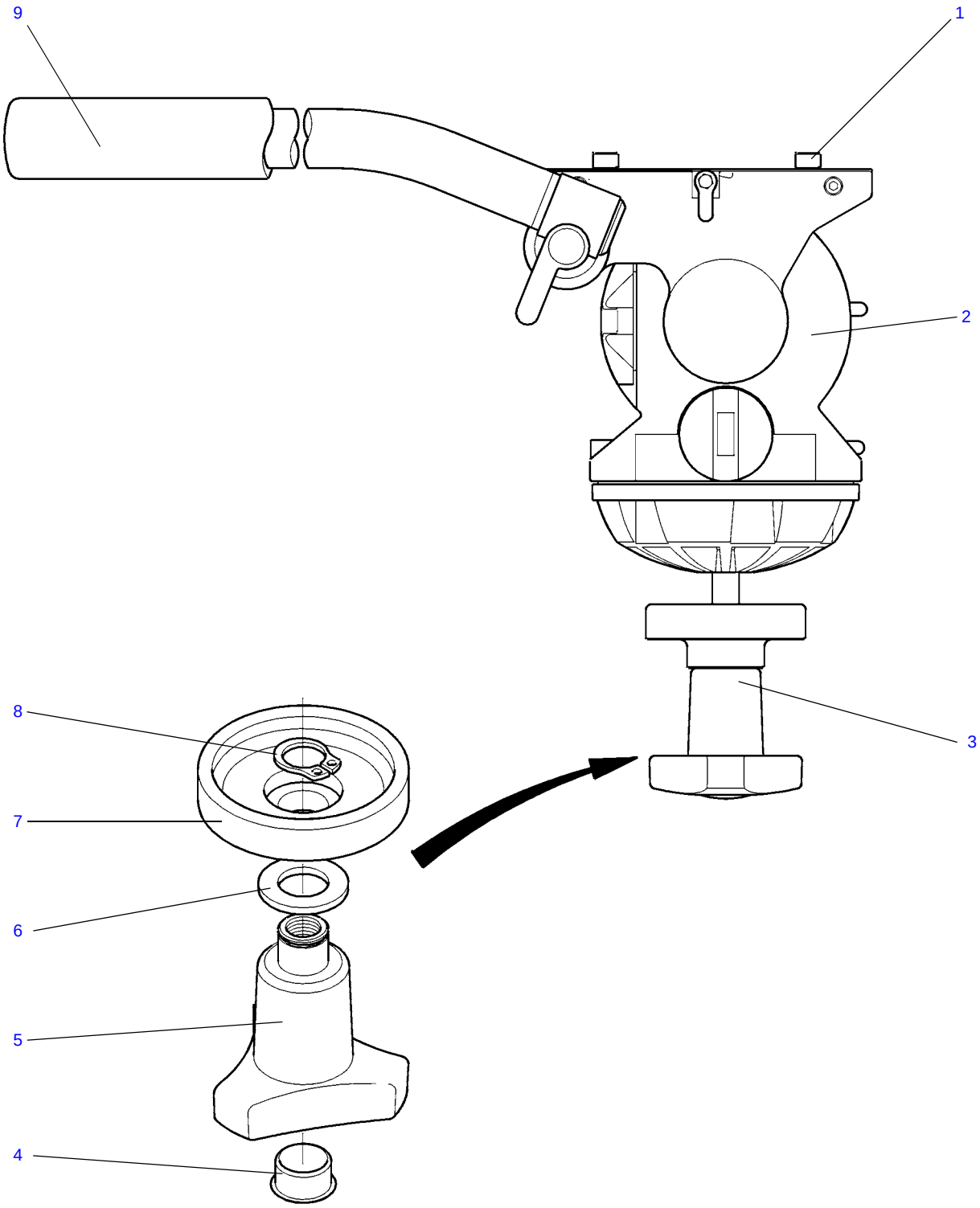


Fig 6.1 Vision 5LF Pan and Tilt Head

Fig 6.1 Vision 5LF Pan and Tilt Head

Item No.	Part No.	Nomenclature	Qty
1	3170-202*	Screw, large	2
NI	3325-362*	Alternative mounting screw (1/4 in. BSW)	1
2	3395-11	Final assembly	1
3	3390-18	Bowl clamp knob assembly comprising:	1
4	J550-068	Hole plug DP625-2663	1
5	3390-228	Knob bowl clamp	1
6	390-238	Washer	1
7	3390-229	Clamp cup	1
8	M701-031	Circlip external type 1400-14 Anderton	1
9	3219-26	Pan bar assembly (Fig 6.5)	1

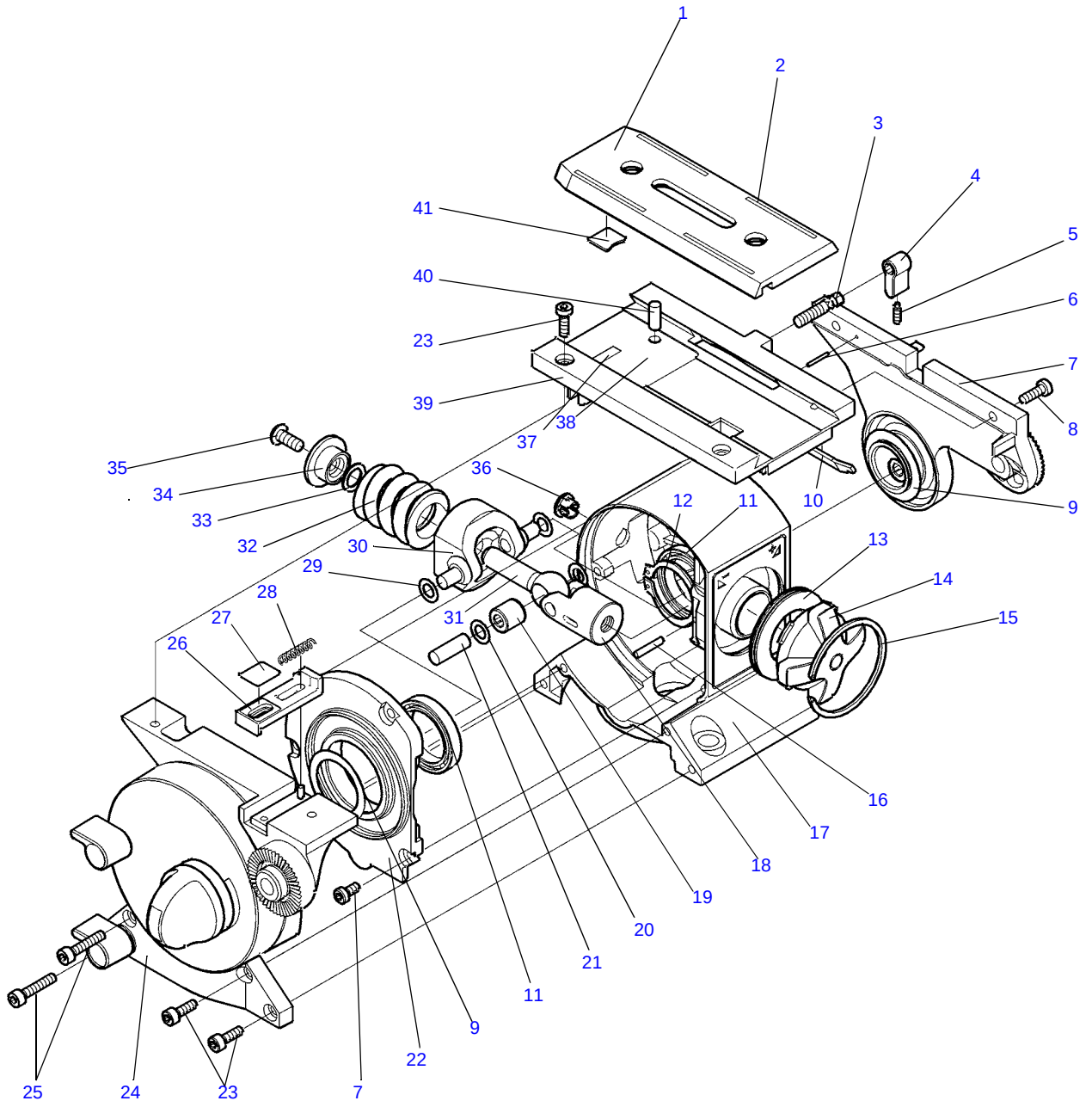


Fig 6.2 Vision 5LF Pan and Tilt Head - Platform and Balance Mechanism

Fig 6.2 Vision 5LF Pan and Tilt Head - Platform and Balance Mechanism

Item No.	Part No.	Nomenclature	Qty
1	3325-342*	Platform slide	1
2	Q001-093*	'O' ring, 3 3/4 in. id x 1/16 in. sect	1
3	3321-278	Screw, slide clamp	1
4	3325-343*	Slide clamp lever	1
5	M004-804*	Grub screw, skt, M3 x 10 mm lg	1
6	M806-033	Spirol pin, 1.5 mm dia. x 12 mm lg	1
7	3395-901SP*	RH side plate assembly	1
8	M005-734*	Screw, low profile cap hd, m4 x 10 mm lg	5
9	3325-319	Bearing shim	2
10	3321-255	Slide clamp strip	1
11	P302-012	Radial bearing, 25 mm x 37 mm x 7 mm	2
12	M701-019	Circlip, external (25 mm shaft)	1
13		Thrust bearing, comprising:	
	P602-021	Thrust washer, 25 mm x 42 mm x 1 mm	2
	P602-020	Thrust race, needle, 25 mm x 42 mm x 1 mm	1
14	3325-15*	Balance knob assembly	1
15	3325-360	Snap ring	1
16	P600-013	Needle roller, 3 mm dia x 15.8 mm lg	1
17	3395-14	Mechanism housing assembly	
18	3395-213	Adjustment slide	1
19	N500-023	Bearing, needle, 1/4 in. x 7/16 in. x 7/16 in.	1
20	3321-222	Shim washer	6
21	L801-098	Dowel pin, 1/4 in. oversize dia x 3/4 in. lg	1
22	3325-323	Mechanism housing cover	1
23	M005-735*	Screw, low profile skt cap hd, M4 x 12 mm lg	4
24		Tilt mechanism (Fig 6.3)	
25	M005-737*	Screw, low profile skt cap hd, M4 x 20 mm lg	2
26	3325-341	Slide release	1
27	3321-276	Release graphic	1
28	J532-109	Spring, compression, 5/32 in. OD x 3/32 in. ID x 3/4 in. lg	1
29	3321-353	Shim	2

Fig 6.2 Vision 5LF Pan and Tilt Head - Platform and Balance Mechanism (Cont)

Item No.	Part No.	Nomenclature	Qty
30	3325-19	Spring actuator	1
31	3325-336	Actuator shaft	1
32	3325-373	Spring, compression	1
33	3325-337	Buffer	1
34	3325-338	End washer	1
35	M006-506*	Screw, skt button hd, M5 x 16 mm lg	1
36	3325-354	Cap	1
37	3395-216	Serial No. label	1
38	3395-215	Platform graphic	1
39	3325-340	Platform	1
40	M801-048	Dowel pin, 5 mm dia x 12 mm lg	1
41	3325-364	Platform slide label	1

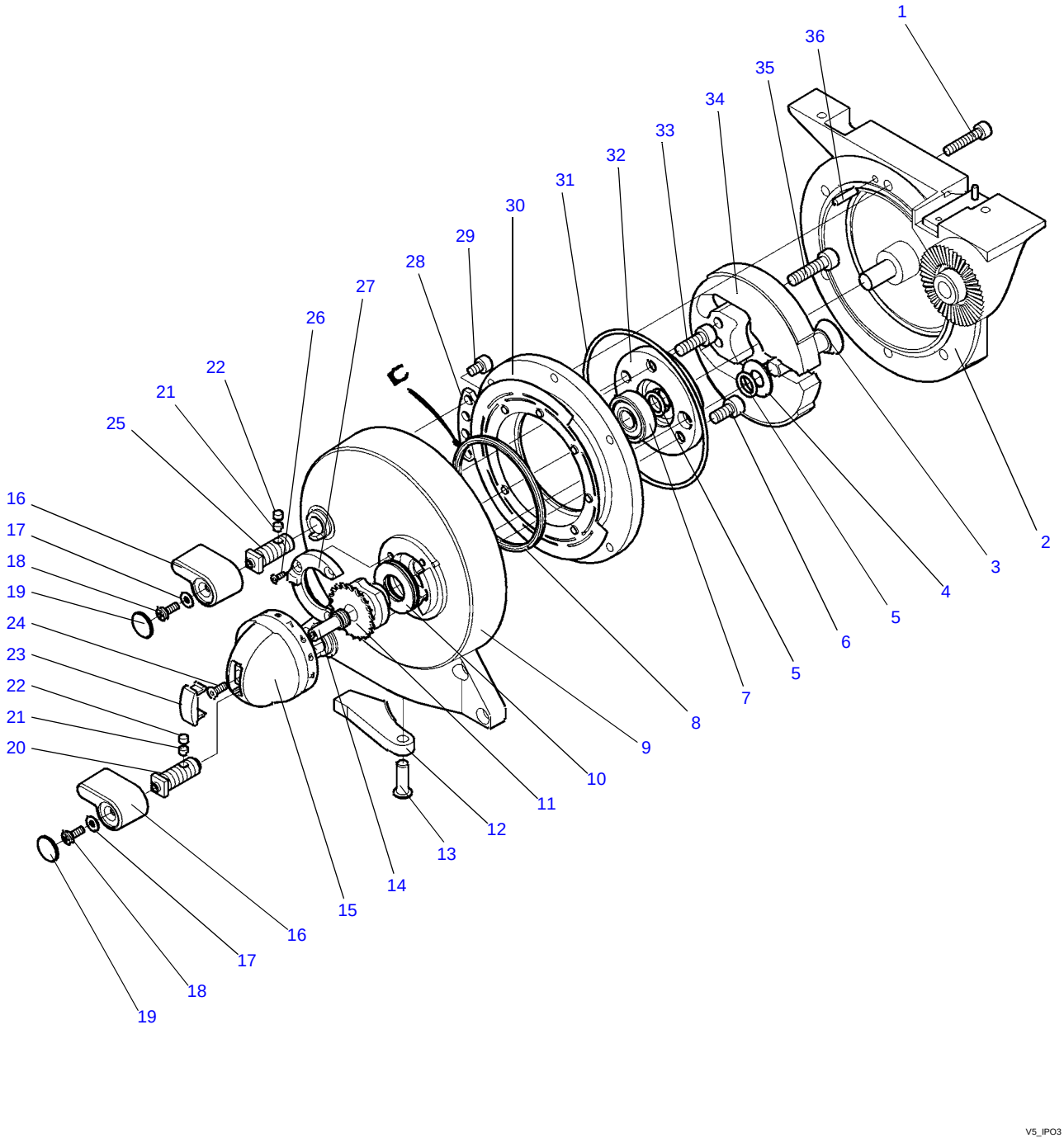


Fig 6.3 Vision 5LF Pan and Tilt Head - Tilt Mechanism

Fig 6.3 Vision 5LF Pan and Tilt Head - Tilt Mechanism

Item No.	Part No.	Nomenclature	Qty
1	M004-714*	Screw, skt cap hd, M3 x 16 mm lg	6
2	3395-902SP*	Tilt drag housing assembly	1
3	3325-324	Tilt drag actuator shaft	1
4	M600-106*	Washer, M8, type B	1
5	Q001-012*	`O' ring, 5/16 in. ID x .070 in. section	2
6	M006-737*	Screw, low profile skt cap hd, M5 x 6 mm lg	1
7	P200-223	Bearing, radial ball, 22 mm x 8 mm x 7 mm	1
8	Q500-032*	Omniseal, 2.118 in. x 1.940 in.	1
9	3395-202	Outrigger	1
10		Thrust bearing, comprising:	
	N552-012	Thrust race, 3/8 in. x 13/16 in. x .078 in.	1
	N552-013	Thrust washer, 3/8 in. x 13/16 in. x .032 in.	2
11	3325-317	Tilt drag knob boss	1
12	3325-16	Pan brake lever assembly	1
13	3325-330	Pan brake pivot	1
14	3321-240	Drag knob retaining shaft	1
15	3395-218*	Tilt drag knob	1
16	3325-328*	Brake knob	2
17	M600-003*	Washer, M3	2
18	M004-002*	Screw, Pozi csk hd, M3 x 6 mm lg	2
19	3395-220*	Brake knob cover	2
	3395-918SP	Pan brake shaft assembly, comprising:	
20	3325-367	Pan brake shaft	1
21	3364-351	Friction element	1
22	3364-352	Spring element	1
23	3325-332*	Drag knob cap	1
24	M004-351*	Screw, raised csk hd, M3 x 6 mm lg	2
	3395-917SP	Tilt brake shaft assembly, comprising:	
25	3395-212	Tilt brake shaft	1
21	3364-351	Friction element	1
22	3364-352	Spring element	1

Fig 6.3 Vision 5LF Pan and Tilt Head - Tilt Mechanism (Cont)

Item No.	Part No.	Nomenclature	Qty
26	M003-103*	Screw, Pozi csk hd, M2.5 x 8 mm lg	3
27	3325-333	Drag knob retainer/stop	1
28	3395-209	Tilt brake plate	1
29	M005-513*	Screw, skt btn hd, M4 x 6 mm lg	3
30	3395-900SP or 3395-908SP	Tilt drag cover/brake disc assembly (for head from Serial No. 1288) or Tilt drag cover/brake disc assembly (for head up to Serial No. 1287)	
31	R900H010*	`O' ring, 75 mm ID x 1.5 mm section	1
32	3390-216	Tilt bearing housing	1
33	M006-702*	Screw, skt cap hd, M5 x 10 mm lg	2
34	3395-16	Drag shoe assembly	1
35	M006-740*	Screw, LP skt cap hd, M5 x 20 mm lg	2
36	M806-014	Spirol pin, 3 mm dia x 10 mm lg	1

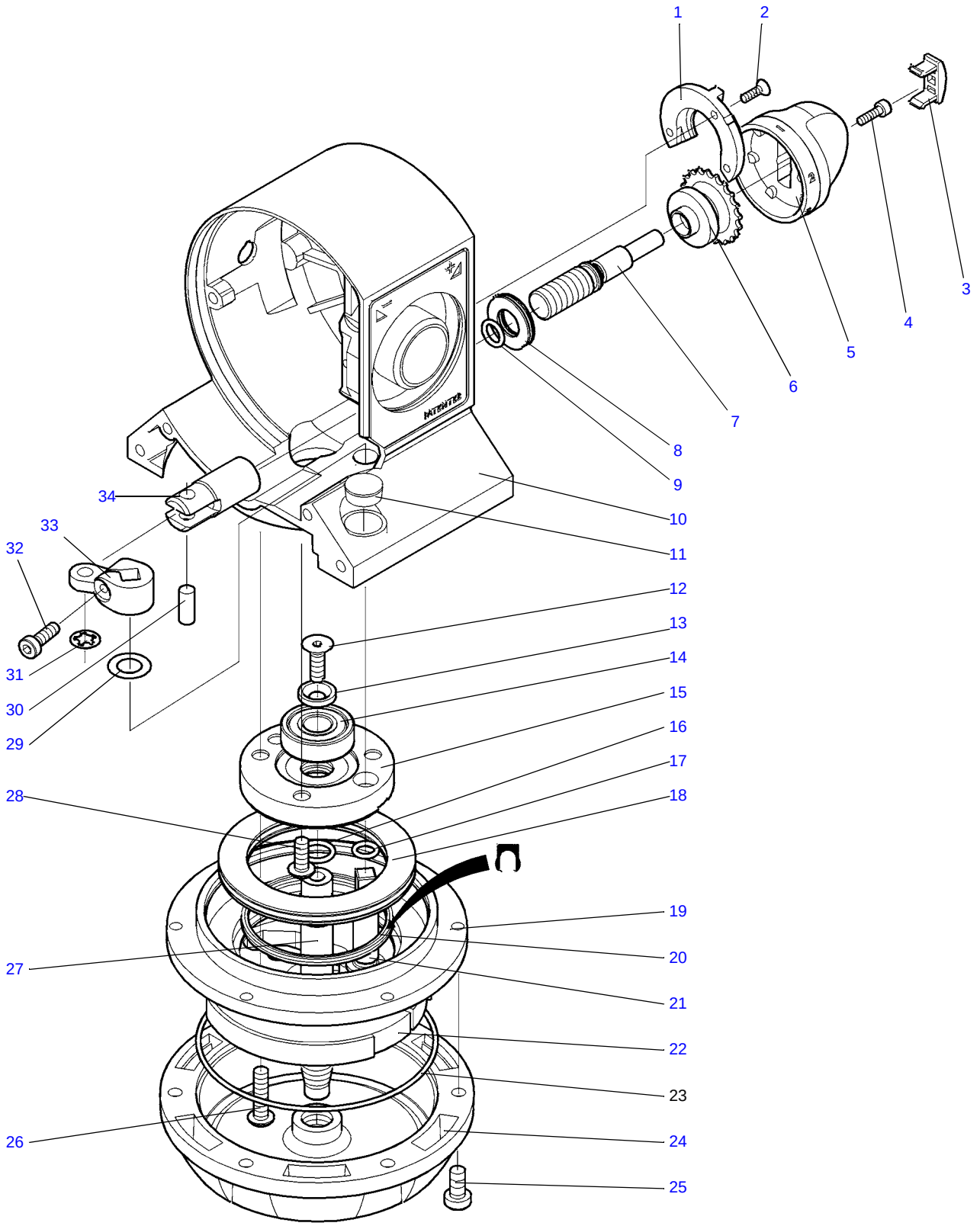


Fig 6.4 Vision 5LF Pan and Tilt Head - Pan Mechanism

Fig 6.4 Vision 5LF Pan and Tilt Head - Pan Mechanism

Item No.	Part No.	Nomenclature	Qty
1	3325-333	Drag knob retainer/stop	1
2	M003-103*	Screw, Pozi csk hd, M2.5 x 8mm lg	3
3	3325-332*	Drag knob cap	1
4	M004-351	Screw, raised chs hd, M3 x 10 mm lg	1
5	3395-217*	Pan drag knob	1
6	3325-317	Pan drag knob boss	1
7	3325-316	Pan drag shaft	1
8		Thrust bearing, comprising:	
	N552-012	Thrust race, 3/8 in. x 13/16 in. x 5/64 in.	1
	N552-013	Thrust washer, 3/8 in. x 13/16 in. x 1/32 in.	2
9	Q001-012*	'O' ring, 5/16 in. ID x 1/16 in. section	1
10	3395-14	Mechanism housing assembly	1
11	3325-361	Level bubble	1
12	M006-903*	Screw, skt csk hd, M5 x 12 mm lg	1
13	3325-313	Pan axis shaft washer	1
14	P200-220	Radial ball bearing, 10 mm x 26 mm x 8 mm	1
15	3395-207	Pan bearing housing	1
16	R900H034*	'O' ring, 10.1 mm ID x 1.6 mm section	1
17	R900H001*	'O' ring, 7.1 mm ID x 1.6 mm section	1
18		Thrust bearing, comprising:	
	P602-023	Thrust race, 50 mm x 70 mm x 3 mm	1
	P602-024	Thrust washer, 50 mm x 70 mm x 1 mm	2
19	3321-207 or 3390-222	Pan drag top plate (for head from Serial No. 1288) or Pan drag top plate (for head up to Serial No. 1287)	1
20	Q500-032*	Omniseal, 2.118 in. x 1.940 in.	1
21	3325-312	Pan drag actuator	1
22	3395-15	Drag shoe assembly	1
23	R900H033* or R900H010*	'O' ring, 72 mm ID x 1.5 mm section (for head from Serial No. 1288) or 'O' ring, 75 mm ID x 1.5 mm section (for head up to Serial No. 1287)	1

Fig 6.4 Vision 5LF Pan and Tilt Head - Pan Mechanism (Cont)

Item No.	Part No.	Nomenclature	Qty
24	3390-235* or 3390-205*	Spherical base (for head from Serial No. 1288) or Spherical base (for head up to Serial No. 1287)	1
25	M005-733*	Screw, low profile skt cap hd, M4 x 8 mm lg	6
26	M006-507*	Screw, skt butt hd, M5 x 20 mm lg	2
27	3390-217*	Bowl clamp stud	1
28	M006-505*	Screw, skt butt hd, M5 x 12 mm lg	2
29	3322-229	Actuator shim	1
30	M801-020	Dowel pin, 5 mm dia x 12 mm lg	1
31	M701-029	Self-locking ring	1
32	M005-735*	Screw, low profile skt csk hd, M4 x 12 mm lg	1
33	3325-314	Pan drag actuator lever	1
34	3325-315	Pan drag clevis	1

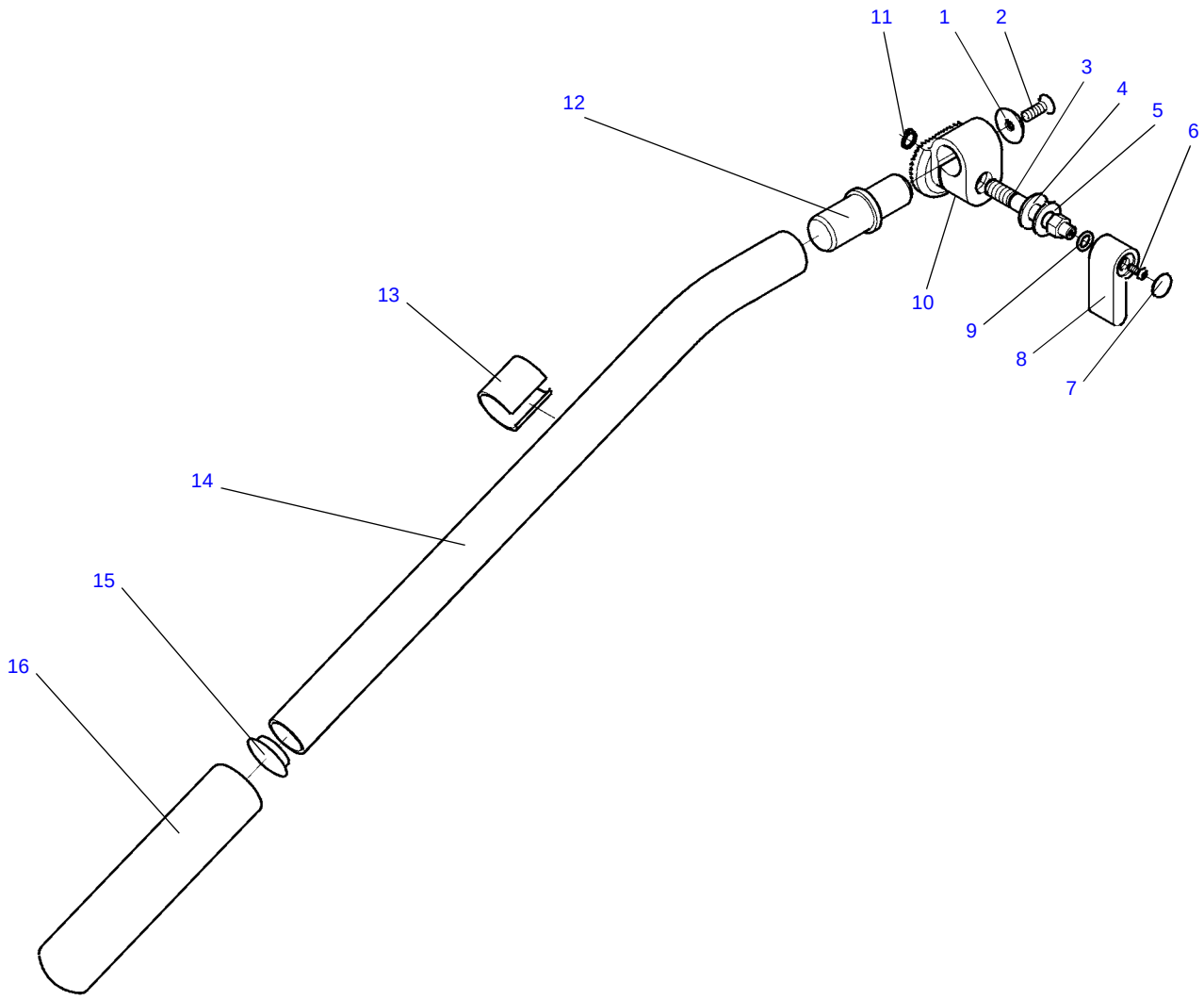


Fig 6.5 Vision 5LF Pan and Tilt Head - Pan Bar

Fig 6.5 Vision 5lf Pan and Tilt Head - Pan Bar

Item No.	Part No.	Nomenclature	Qty
	3219-26	Pan bar unit, comprising	1
1	M606-001*	Washer, black nylon, 18 mm OD x 5.3 mm ID x 3.8 mm thk, Skiffy 07-3-5	1
2	M006-113*	Screw, pozi csk hd, M5 x 12 mm lg	1
	3219-27	Pan bar clamp assembly, consisting of:	1
3	3219-226	Shaft, clamp	1
4	G249-007	Nylon sleeve, 18-8-2, Skiffy	1
5	M600-010	Washer, type A, M8	1
6	M004-503*	Screw, butt hd, M3 x 8 mm lg	1
7	3321-253	Brake knob cap	1
8	3219-225	Knob, pan bar clamp	1
9	Q001-010*	'O' ring, 1/4 in. ID x 3/8 in. OD x 1/16 in. sect	1
10	3219-247	Pan bar clamp	1
11	L701-004	Circlip, 5100-31, Anderton	1
	3219-20	Pan bar assembly, consisting of:	1
12	3219-229	Spigot, pan bar	1
13	3219-227	Sleeve, pan bar	1
14	3219-228	Pan bar	1
15	J550-074	Round insert	1
16	3219-239	Grip, pan bar	1

Fig 6.6 Vision 5LF Pan and Tilt Head - Composite Spare Parts

Part No.	Nomenclature	Qty
3325-901SP	Platform slide assembly, comprising:	
3325-342	Platform slide	1
3170-202	Screw (large)	2
3325-362	Screw, 1/4 in. BSW	1
Q001-093	'O' ring	1
3390-906SP	Bowl and stud spares assembly - early heads, comprising:	
3390-205	Spherical base	1
3390-217	Bowl clamp stud	1
3390-907SP	Bowl and stud spares assembly - later heads, comprising:	
3390-235	Spherical base	1
3390-217	Bowl clamp stud	1
3395-900SP	Tilt drag cover/brake disc assembly (for head from Serial No. 1288), comprising:	
3395-209	Tilt drag top plate	1
3395-210	Tilt brake disc	1
M806-040	Spirol pin, 2 mm dia x 8 mm lg	2
3395-901SP	RH side plate assembly, comprising:	
3395-204	RH side plate	1
L850-032	Helicoil insert, 5/16 in. BSF	1
N500-025	Needle roller bearing	1
3395-902SP	Tilt drag housing assembly, comprising:	
3395-203	Tilt drag housing	1
3395-219	Tilt axis shaft	1
N500-025	Needle roller bearing	1
L850-032	Helicoil insert, 5/16 in. BSF	1
M806-042	Spirol pin, 2.5 mm dia x 8 mm lg	1

Fig 6.6 Vision 5LF Pan and Tilt Head - Composite Spare Parts (Cont)

Part No.	Nomenclature	Qty
3395-903SP	Knobs and levers kit, comprising:	
3325-15	Balance knob assembly	1
3325-328	Brake knob	2
3325-332	Drag knob cap	2
3325-343	Slide clamp lever	1
3395-217	Pan drag knob	1
3395-218	Tilt drag knob	1
3395-220	Brake knob cover	2
M004-002	Screw, Pozi csk hd, M3 x 6 mm lg	2
M004-351	Screw, raised csk hd, M3 x 6 mm lg	2
M004-804	Grub screw, skt, M3 x 10 mm lg	1
3395-904SP	Set of screws and washers, comprising:	
3170-202	Screw, large	2
M003-103	Screw, Pozi csk hd, M2.5 x 8 mm lg	6
M004-002	Screw, Pozi csk hd, M3 x 6 mm lg	2
M004-351	Screw, raised csk hd, M3 x 6 mm lg	2
M004-503	Screw, butt hd, M3 x 8 mm lg	1
M004-714	Screw, skt cap hd, M3 x 16 mm lg	6
M004-804	Grub screw, skt, M3 x 10 mm lg	1
M005-733	Screw, low profile skt cap hd, M4 x 8 mm lg	10
M005-734	Screw, low profile cap hd, m4 x 10 mm lg	5
M005-735	Screw, low profile skt csk hd, M4 x 12 mm lg	8
M005-737	Screw, low profile skt cap hd, M4 x 20 mm lg	2
M006-113	Screw, pozi csk hd, M5 x 12 mm lg	1
M006-505	Screw, skt butt hd, M5 x 12 mm lg	2
M006-506	Screw, skt button hd, M5 x 16 mm lg	1
M006-507	Screw, skt butt hd, M5 x 20 mm lg	2
M006-702	Screw, skt cap hd, M5 x 10 mm lg	2
M005-737	Screw, low profile skt cap hd, M5 x 6 mm lg	1
M006-740	Screw, LP skt cap hd, M5 x 20 mm lg	2
M006-903	Screw, skt csk hd, M5 x 12 mm lg	1

Fig 6.6 Vision 5LF Pan and Tilt Head - Composite Spare Parts (Cont)

Part No.	Nomenclature	Qty
M600-003	Washer, M3	2
M600-106	Washer, M8, type B	1
M606-001	Washer, black nylon, 18 mm OD x 5.3 mm ID x 3.8 mm thk, Skiffy 07-3-5	1
3395-905SP	Seal kit, comprising:	
Q500-032	Omniseal, 2.118 in. x 1.940 in.	2
Q001-012	'O' ring, 5/16 in. ID x 1/16 in. section	3
R900H001	'O' ring, 7.1 mm ID x 1.6 mm section	1
R900H010	`O' ring, 75 mm ID x 1.5 mm section	1
R900H033	`O' ring, 72 mm ID x 1.5 mm section	1
R900H034	'O' ring, 10.1 mm ID x 1.6 mm section	1
3395-908SP	Tilt drag cover/brake disc assembly (for head up to Serial No. 1287), comprising:	
3395-907SP	Tilt drag top plate (for head up to Serial No. 1287)	1
3395-210	Tilt brake disc	1
M806-040	Spirol pin, 2 mm dia x 8 mm lg	2
3395-916SP	Brake shafts kit, comprising:	
3325-367	Pan brake shaft	1
3395-212	Tilt brake shaft	1
3364-351	Friction element	2
3364-352	Spring element	2
3325-328	Brake knob	2
3395-220	Brake knob cover	2
M004-002	Screw, Pozi csk hd, M3 x 6 mm lg	2
3395-917SP	Tilt brake shaft assembly, comprising:	
3395-212	Tilt brake shaft	1
3364-351	Friction element	1
3364-352	Spring element	1
3395-918SP	Pan brake shaft assembly, comprising:	

Fig 6.6 Vision 5LF Pan and Tilt Head - Composite Spare Parts (Cont)

Part No.	Nomenclature	Qty
3325-367	Pan brake shaft	1
3364-351	Friction element	1
3364-352	Spring element	1