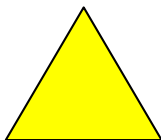


Keeler

Vantage Digital

Indirect Ophthalmoscope

Service Manual



ALWAYS READ THE INSTRUCTIONS

A
HALMA GROUP
COMPANY

Keeler Limited, Clewer Hill Road, Windsor, Berks, United Kingdom. SL4 4AA.
Tel No. +44 (0) 1 753 857177 Fax No. +44 (0) 1 753 830247

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Introduction

This manual covers servicing of Vantage Digital version of the Vantage Indirect Ophthalmoscope. Whilst many of the parts are common with the Vantage +, this manual should be used for all repairs and adjustments to Vantage Digital.

Service Principles

The Vantage Digital comprises a number of modules which have been built and aligned in the factory. These modules can not be reliably aligned without the special jigs and should not therefore be disassembled further than described in this manual. There is a strong possibility of the unit developing diplopia or hyperphoria if the Viewing Optics are disassembled or adjusted. Where a sub-assembly is quoted it cannot normally be reliably repaired without special tools, adhesive and/or jigs.

Tools Required

Most of the tools required will be in standard electro-mechanical toolkit.

The following special tools will make assembly and disassembly easier.

TD351 Lock Ring Key for Eyepieces.

A Computer with the Vantage Digital software loaded is required to check and set up the camera. Please see Vantage Digital Software Setup and Quick Start Guide (EP59-09871) for details.

Precautions

Care should be taken to carry out any repair work on a clean soft surface to minimise damage to the outside of the unit.
Solvents should **not** be used for cleaning.

Observe **Anti-Static** precautions when handling the camera components.

Disassembly

Repairs to the Digital part of the Vantage Digital can be carried out whilst the Unit is still attached to the Browbar.

However virtually all repairs inside the head involve removing both the Viewing Optics Assy and the Illumination Assy from the Rear Cover. This involves removing the whole Optics Assy from the Browbar.

Remove the Front Moulding complete with Camera etc.

1. Remove 2 off Mirror Spindle Knob (14) by gently pulling.
2. Carefully lift 2 off Control Knob Label (9) with the point of a sharp blade. They are self adhesive.
3. Remove 2 off M2 x 8 Csk PT Screws (11) from the centre of the 2 Control Knobs.
4. Remove the 2 Control Knobs (5).

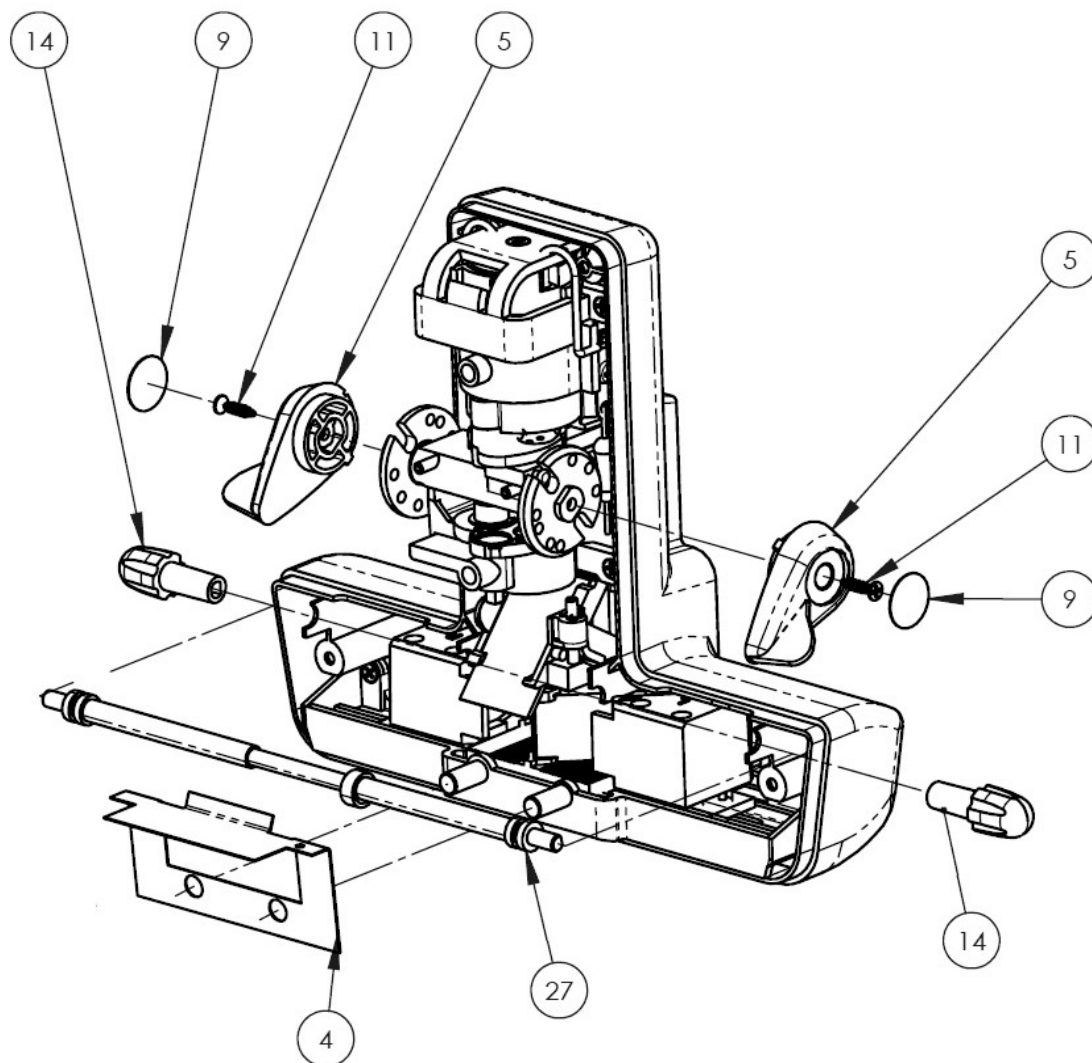


Figure 1

5. Turn the Optics Head over and slide the Eyepieces to the middle to reveal 2 off M2 x 8 Csk PT Screws (Figure 2 - 11). Remove these screws.
6. Remove 2 off M2 x 8 Csk PT Screws (Figure 2 - 11) from the top of the unit above the Browbar Mount.
7. Lift the Front Cover off by carefully prising the sides by the filter controls apart to allow the cover to slide over the filter controls.
8. Carefully remove the Light Shield (Figure 1 - 4).
9. Remove the Mirror Spindle (Figure 1 - 27).

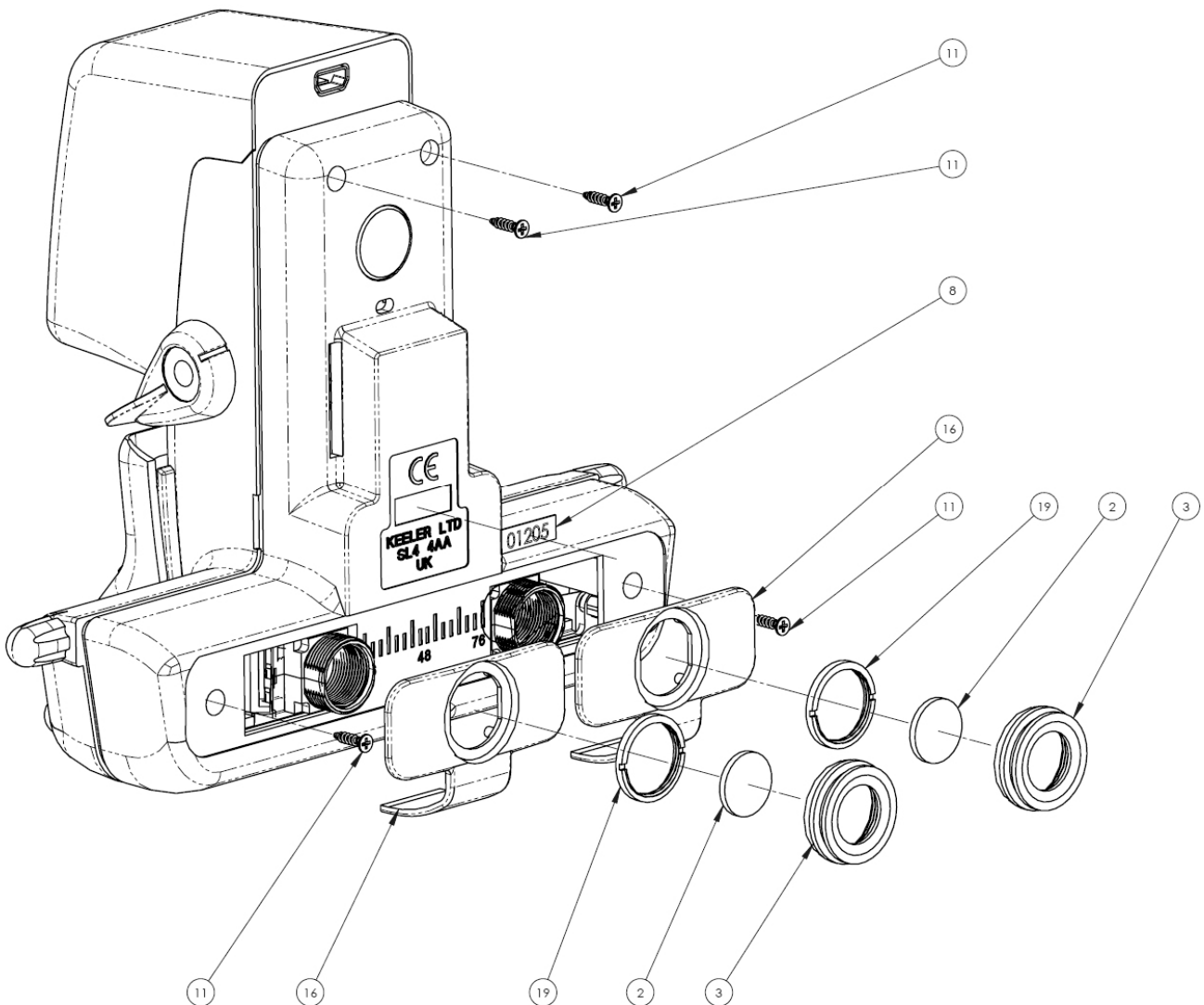


Figure 2

Note that any further dismantling of the Front Moulding unit will necessitate setting up of either the Camera or Mirror or both.

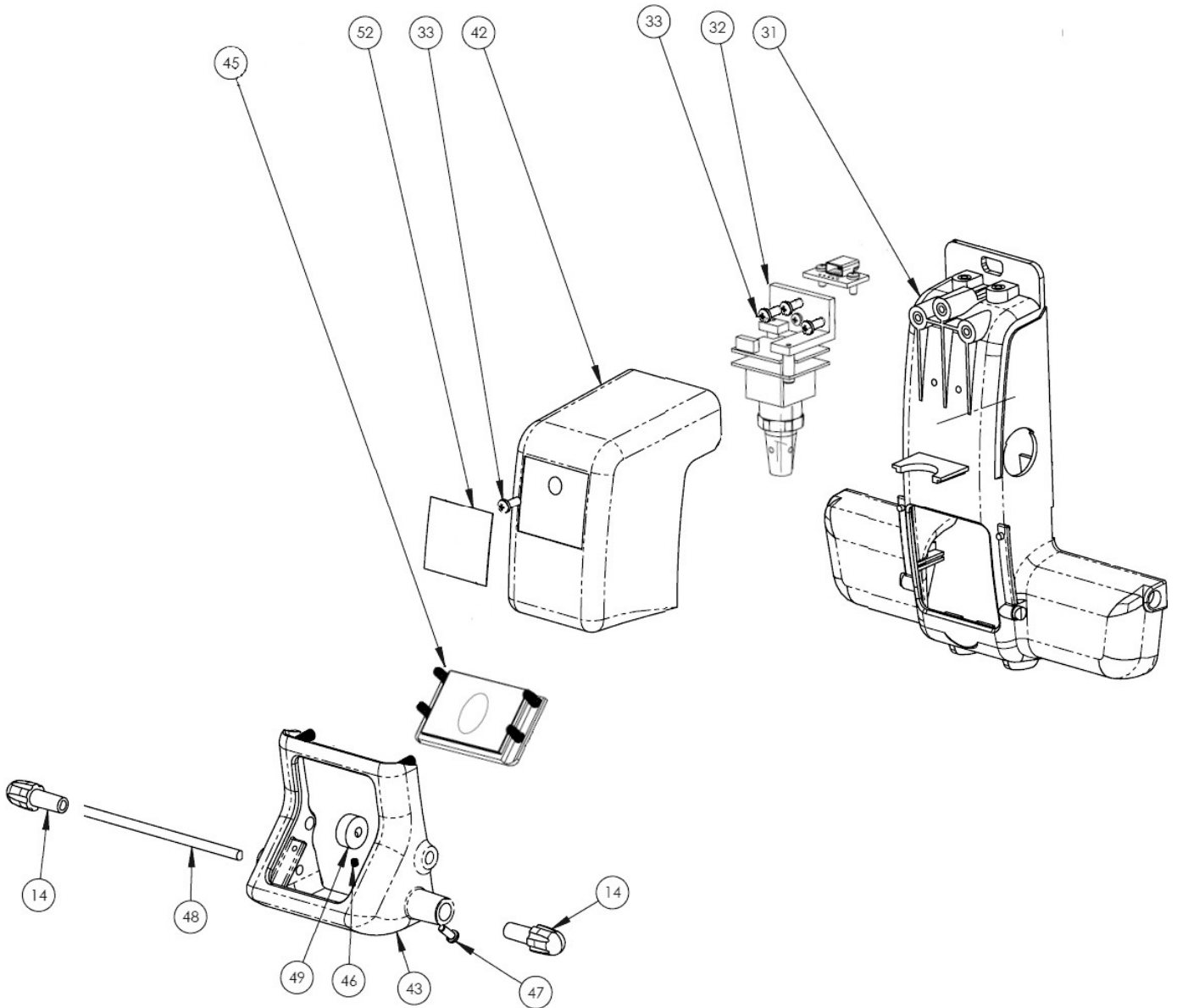


Figure 3

Remove Mirror Mount Assy

Refer to figure 3

1. Carefully insert a flat bladed screwdriver between the Mirror Mount Assy (43) and the Front Moulding Assy (31) at the pivot point so that the Mirror Mount Assy (43) can be sprung over the pivot allowing the Mirror Mount to be removed. Take care that the 2 Springs attached to the Mirror Mount Assy (43) are not dislodged.

Replace Semi-Reflective Mirror Assy

Refer to figure 3

1. Remove 2 off Spindle Knob (14)
2. Slacken the Grub Screw (46) on the Cam (49)
3. Withdraw the Shaft (48) from both the Cam (49) and the Mirror Mount (43)
4. Slacken 2 off M2 x 8 Pan Hd Screw (47) until the end of the screws are flush with the Web they are mounted in.
5. The Semi-Reflective Mirror Assy (45) may now be withdrawn from the Mirror Mount Assy (43)
6. The replacement Semi-Reflective Mirror Assy (45) may now be fitted taking care not to dislodge 4 off Springs fitted to the Mirror Frame.
7. Screw 2 off M2 x 8 Pan Hd Screw (47) until there is a gap of approx 2 mm between the Mirror Frame and the Web the screws are mounted in. Final adjustment is covered under setting up later in this manual.

Replace the Mirror Mount Assy

Refer to figure 3

1. Carefully fit the Shaft (48) through the bosses on the Mirror Mount Assy (43) with the Cam (49) in the centre.
2. Replace 2 off Spindle Knob (14) ensuring that the 'D' shaped hole in the Knob (14) is aligned with the flat on the Shaft (48)
3. Locate the Cam (49) so that the Grub Screw (46) is over the flat on the Shaft (48) and tighten the Grub Screw (46)
4. The Mirror Mount Assy can now be replaced on the Front Cover Assy by slipping one of the holes on the Mirror Mount Assy over one of the spigots on the Front Cover Assy whilst ensuring that the Springs are located on the spigots on the Front Cover Assy and then clicking the other side of the Mirror Mount Assy over the other spigot.

Replace the Camera Assy

Refer to figure 3

1. Carefully lift the self-adhesive 'Vantage Plus Digital' label (52) by inserting a blade under the label and lifting it taking care not to damage the label.
2. Remove 1 off M2.5 x 6 Pan Head Screw (33) holding the Cover (42) to the Front Cover Assy (31)
3. Lift off the Cover (42) to reveal the Camera Assy
4. Carefully unplug the miniature connector from the USB PCB on the Camera Assy PCB.
5. Remove 3 off M2.5 x 6 Pan Head Screw (33) holding the Camera Assy (32) to the Front Cover Assy (31)

6. Fit the replacement Camera Assy (32) to the Font Cover Assy (31) using 3 off M2.5 x 6 Pan Head Screw (33). Adjust the position of the Camera so that the Lens Assy sits in the middle of the semi-circular cut-out.
7. Re-connect the miniature connector from the USB PCB to the Camera PCB.

Remove the Optics Head from the Browbar

Refer to figure 4

1. Unplug the power supply from the Dimmer Block.
 2. Remove the Browbar from the Headband by undoing the knobs.
 3. Remove 3 off No2 x $\frac{3}{8}$ " PT screws (17) holding the Dimmer Block to the Browbar.
 4. Carefully unsolder the 2 wires from the PCB (29). It may be easier to remove the PCB Assy from the Dimmer Housing (7).
 - 4.1. Slide the Blue Indicator Pin (21) out of the Control Knob (6).
 - 4.2. Slacken the Allen Screw (30) holding the Knob to the Dimmer Control and remove the Knob.
 - 4.3. Undo the Nut on the Dimmer Control
 - 4.4. Remove the Dimmer PCB Assy.
- Note that these wires will need to be re-soldered after the repair is completed and there is insufficient spare length to strip the wires again.
5. Undo the Hinge Clamp from the Hinge Pin and remove the Hinge Pin taking care not to lose the Spacer or the 2 washers under the Hinge Clamp.
 6. The Optics Head can now be separated from the Browbar.

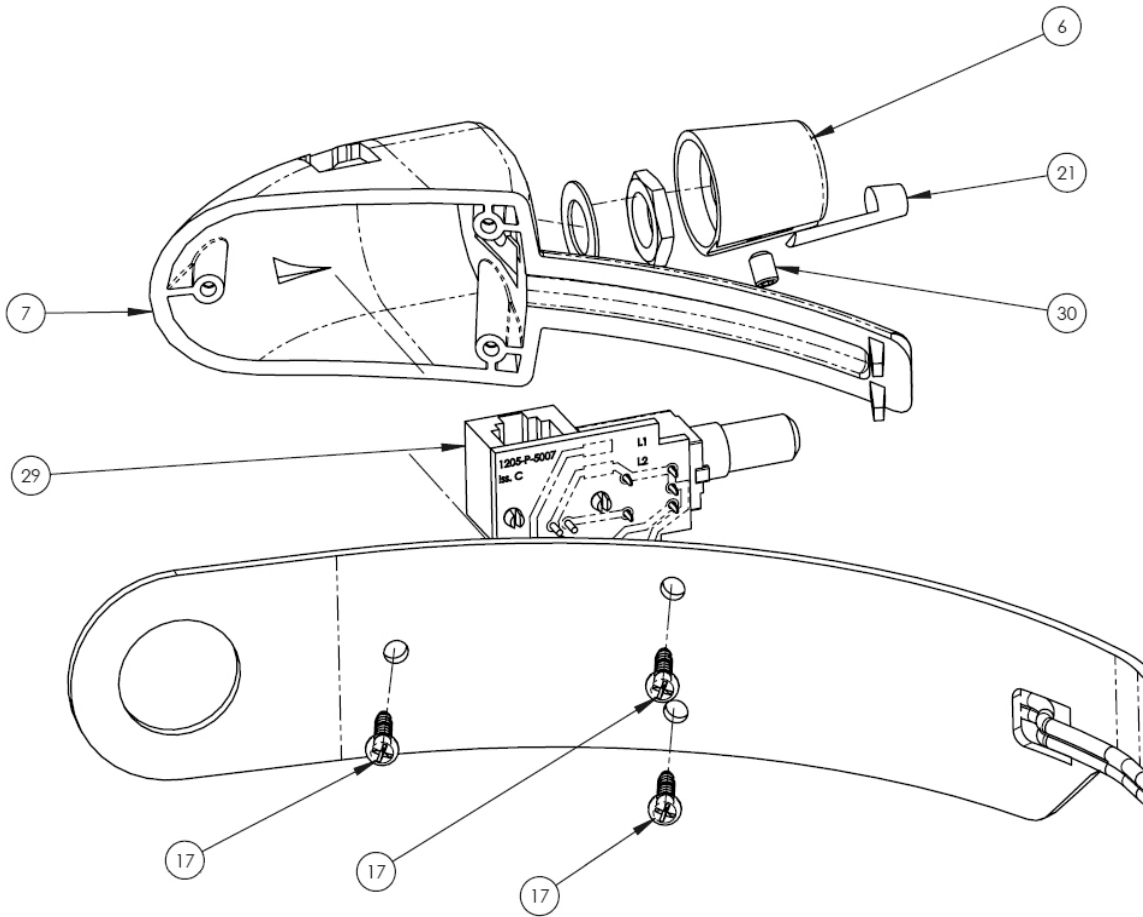


Figure 4

Remove the Viewing Assy and Illumination Assy.

Refer to figure 5

1. Unscrew 2 off Eye Cap (3) being careful not to lose the +2D Eye Lenses (2).
2. Unscrew 2 off Eyepiece Lock Ring (19) using TD351 Lock Ring Key.
3. Remove 2 off P D Slider (16)

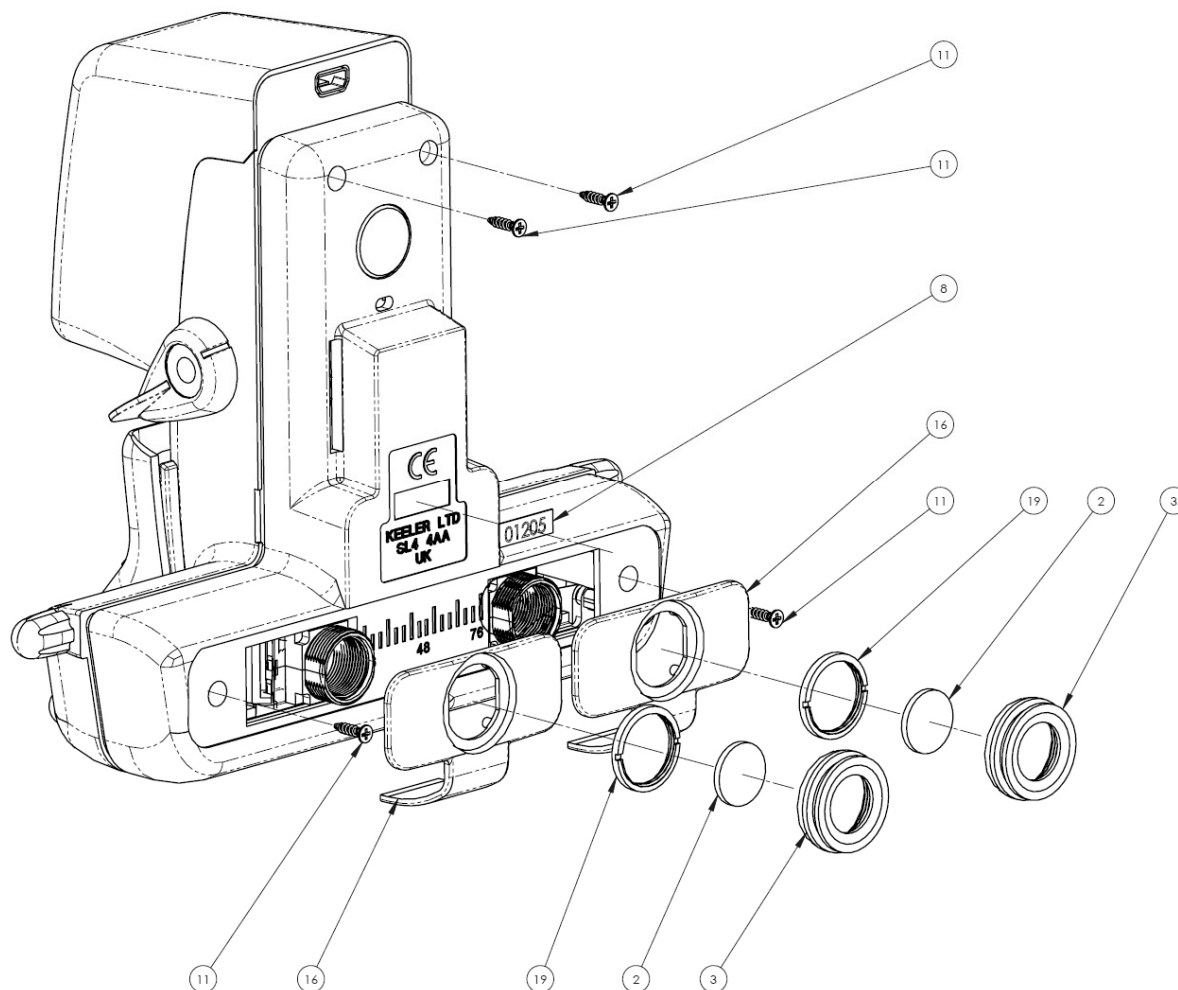


Figure 5

4. Turn the unit over

Refer to figure 6

5. The Viewing Assy (25) and Illumination Assy (26) are joined by the Centre Spindle (22) and must be removed together.
6. Remove 2 off M2 x 8 Csk PT Screws (11) from the Viewing Assy (25).
7. Remove 4 off M2 x 8 Csk PT Screws (11) from the Illumination Assy (26)
8. Carefully lift the 2 assemblies together from the Rear Cover Moulding (15)
9. The 2 assemblies can now be separated.

Further disassembly of either the Illumination Assy or the Viewing Assy is not advised as special tools and jigs are required to reassemble and align.

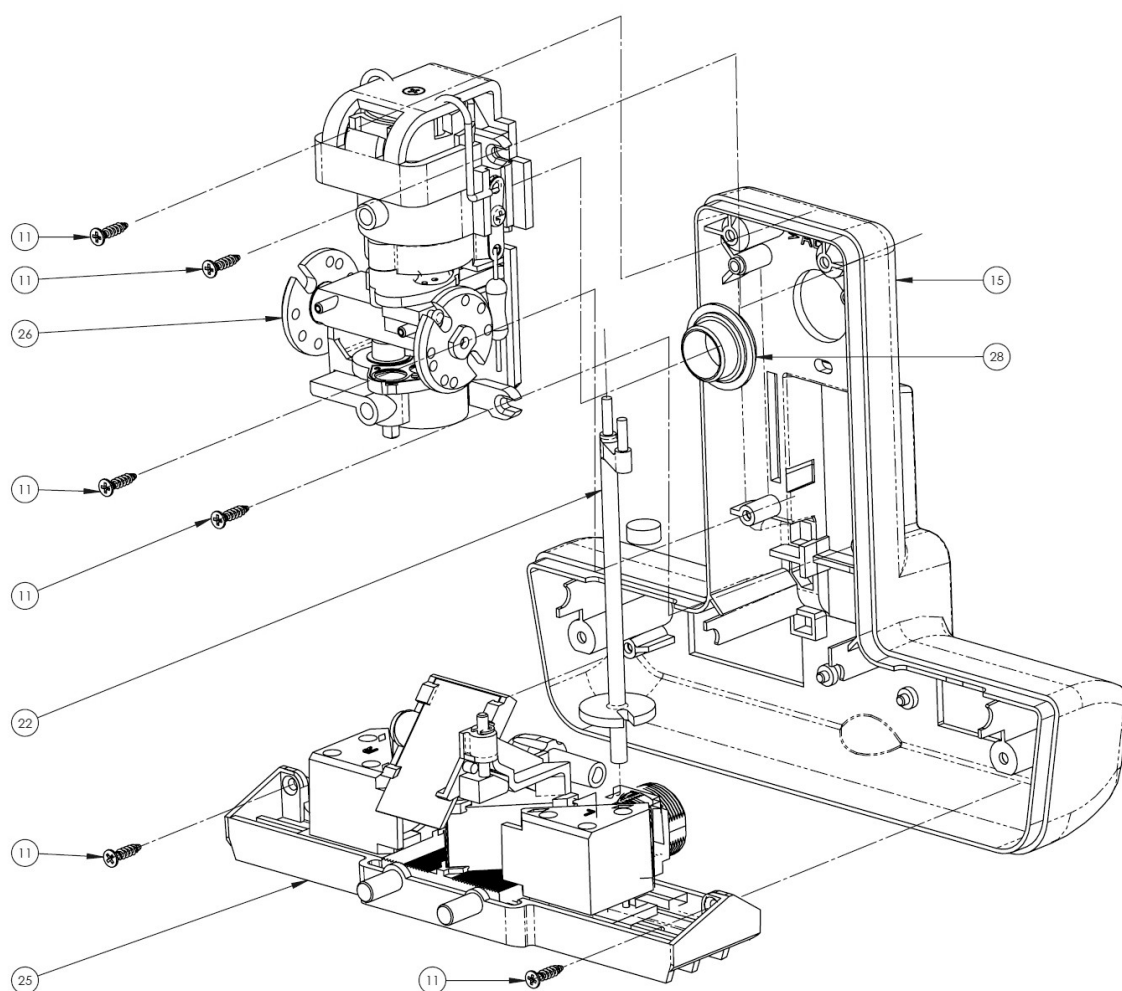


Figure 6

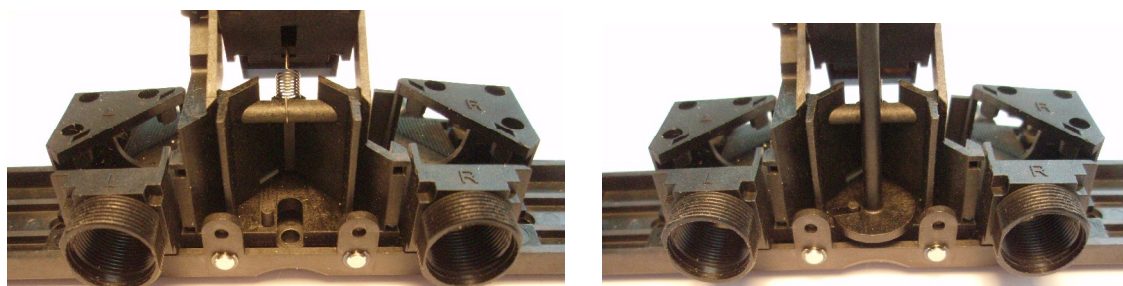
Reassembly

Refit Illumination Assy and Viewing Assy

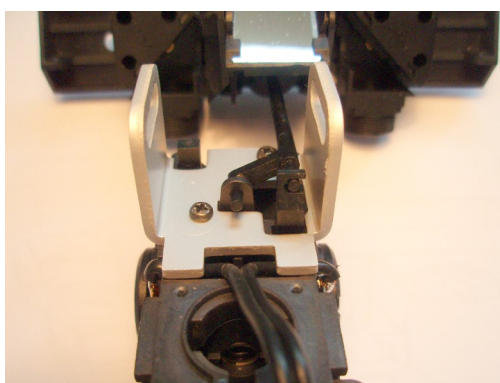
Great care must be taken to avoid any strain on the Eyepiece Mirror Mounts as these have been carefully aligned on the laser jig during manufacture. Avoid holding the Viewing Assy by the Mirror Mounts.

Refer to Figure 6

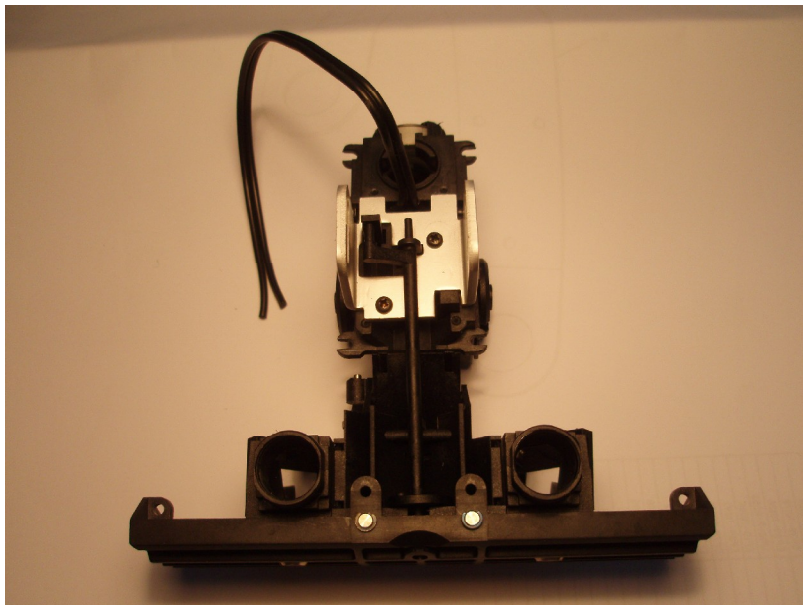
1. Stand the Viewing Assy on its base.
2. Locate the Centre Spindle (22) in the base of the Viewing Assy (25) so that the peg on the moving Centre Mirror Assy engages with the slot on the Centre Spindle



3. Locate the Illumination Assy (26) onto the top end of the Centre Spindle so that it engages with the Graticule Carrier. It will be necessary to rotate the Graticule Wheel to the smallest aperture so that the link is sticking out.



Lay the Viewing and Illumination Assemblies together as shown below ensuring that the Centre Spindle remains engaged at both ends.



4. Carefully thread the cable from the Illumination Assy (26) up through the Rear Cover Moulding (15) ensuring that the cable is not twisted.
5. Align the Browbar Mount with the slots on the Rear Cover Moulding (15) and carefully locate the Rear Cover Moulding over the Viewing and Illumination Assemblies.

Refer to figure 5

6. Place 2 off P D Slider (16) over the Eyepieces
7. Carefully fit 2 off Eyepiece Locking Ring (19) using TD351 Lock Ring Key.
8. Fit 2 off +2D Eye Lens (2) into the Eyepieces.
9. Secure these in place with 2 off Eye Cap (3).
10. Turn the unit over onto the Browbar Mount.
11. Operate the Graticule Wheel and ensure that the Mirror Block on the Viewing Assy moves to and fro. If not, return to 3 above removing the items fitted to the Eyepieces first.

Refer to figure 6

12. Fit 2 off M2 x 8 Csk PT Screws (11) to retain the Viewing Assy.
13. Fit 4 off M2 x 8 Csk PT Screws (11) to retain the Illumination Assy.

Refer to figure 1

14. Refit the Mirror Spindle (27) under the Mirror, ensuring that the cam is to the right of the Mirror and that it engages in the Rear Cover Moulding.
15. Rotate the Mirror Spindle to lift the Mirror to its Highest point.
16. Carefully fit the Light Shield (4) over the 2 pins in the Viewing Assy ensuring that it fits under the Mirror.
17. Carefully blow out any dust in the unit.
18. Offer the Front Cover Assy over the main assembly ensuring that the Light Shield (4) fits into the slots behind the window and under the Mirror. It will be necessary to gently spring the Front Cover to clear the Graticule and Filter Wheels.
19. Turn the unit over and slide the Eyepieces together.
20. Fit 4 off M2 x 8 Csk PT Screws – 2 on the Viewing Assy and 2 above the Illumination Assy.
21. Fit 2 off Control Knob (5) to the Graticule / Filter Wheels using 2 off M2 x 8 Csk PT Screws. Hold the Control Knob whilst tightening the screws.
22. Fit 2 off self-adhesive Control Knob Label (9) to the Control Knobs.
23. Fit 2 off Spindle Knob (14) to the Mirror Spindle ensuring that the 'D' shaped hole mates with the 'D' shape on the Spindle.
24. Fit the Camera Cover using 1 off M2.5 x 6 Screw (33)

Refit to Browbar

1. Note the positions of the Washers
2. Thread the cable through the grommet in the Browbar

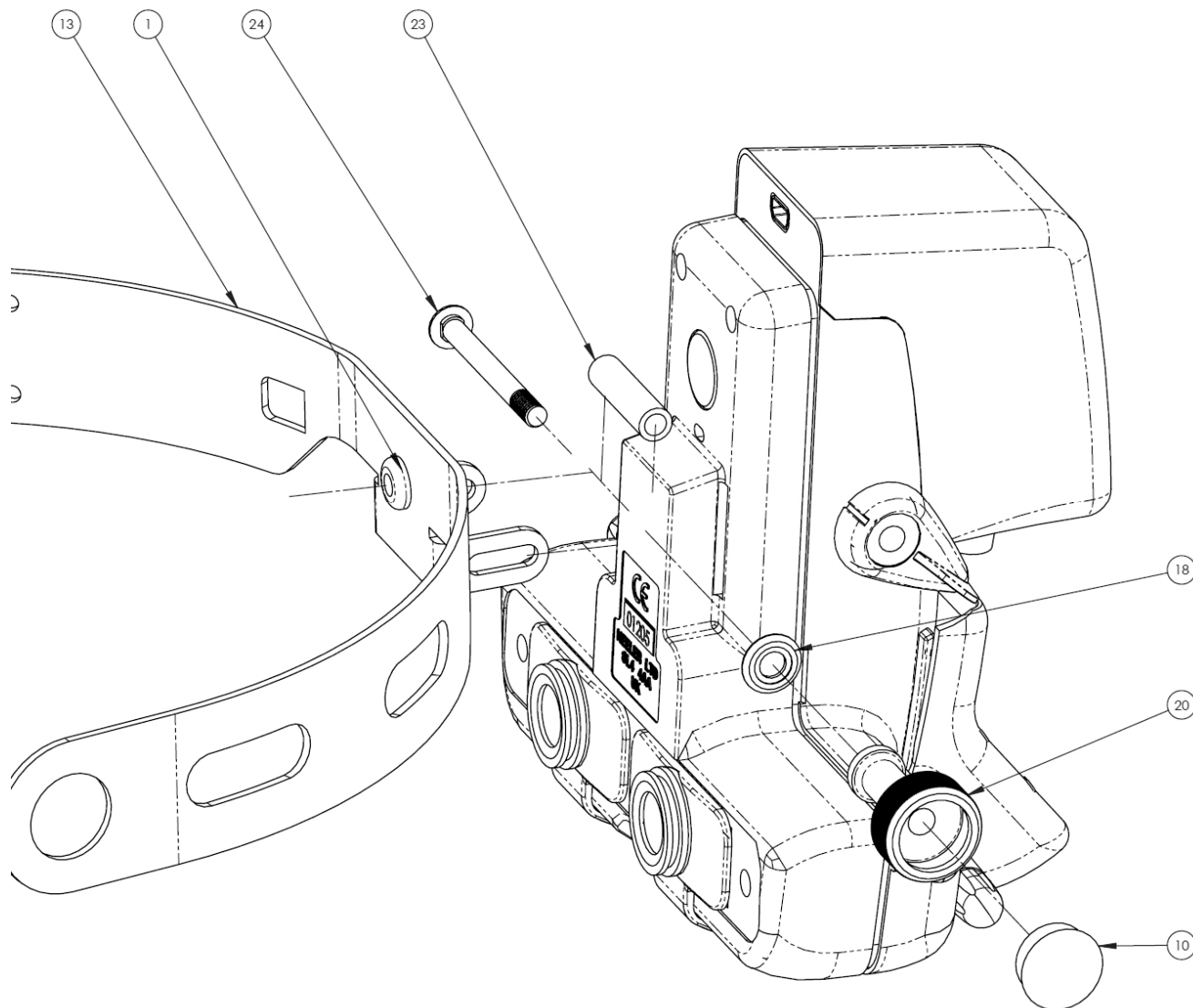
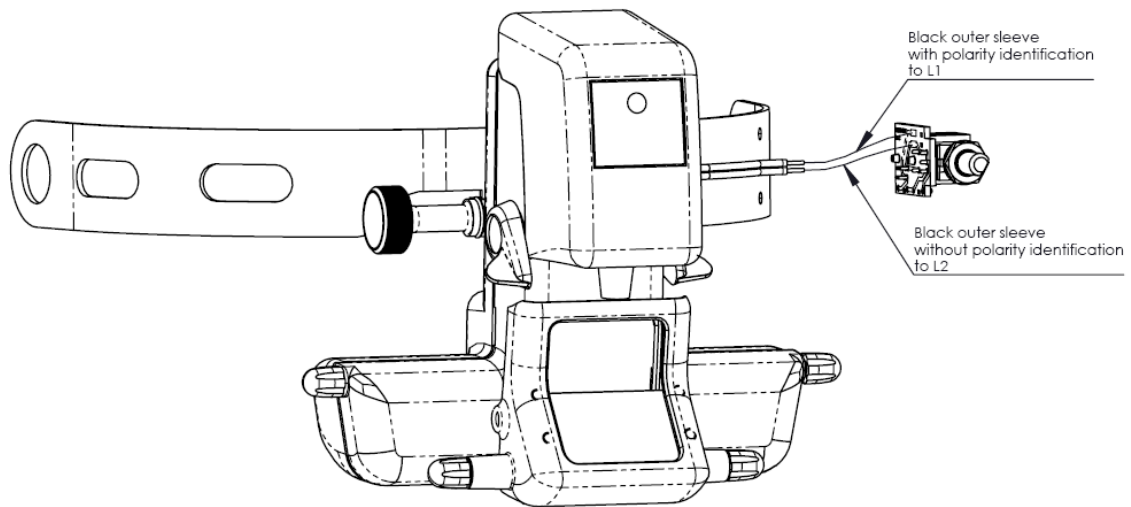


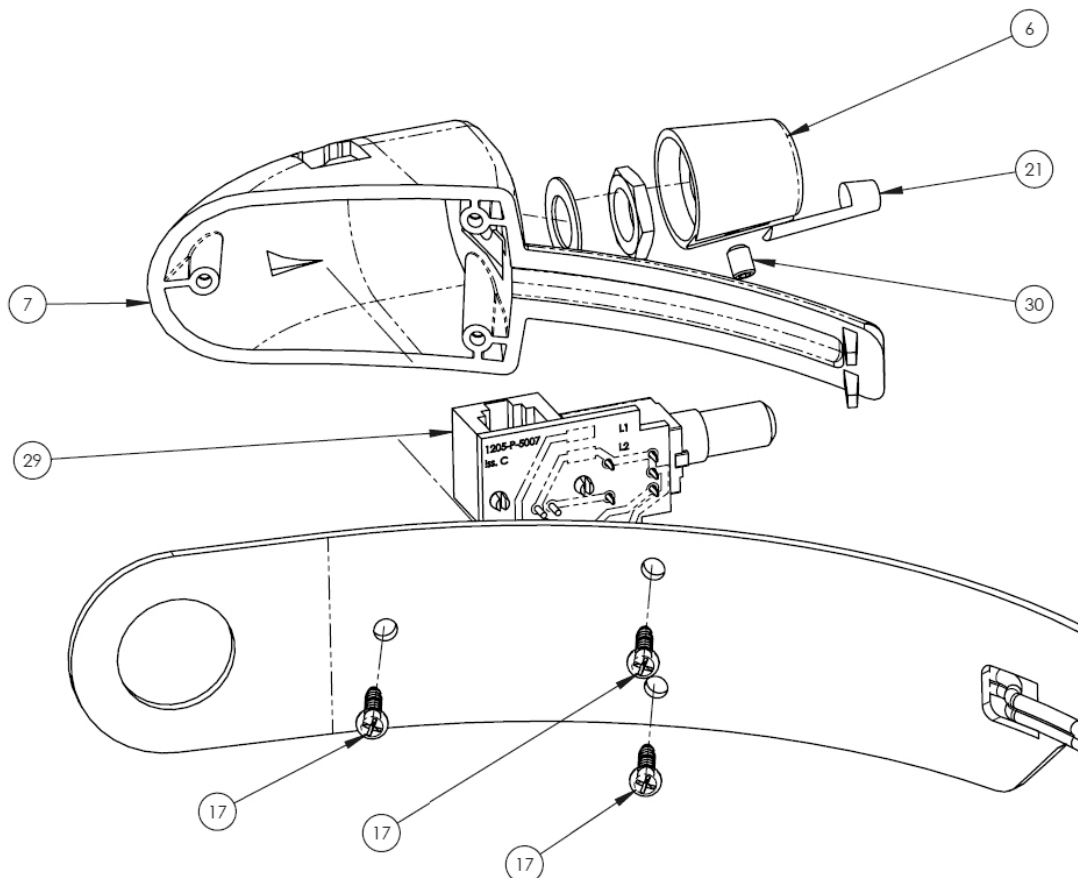
Figure 7

3. The cable must be a total of 135mm long including the stripped ends from the Grommet in the Browbar. If a new cable has been fitted
 - 3.1 Trim the cable to 135mm from the grommet.
 - 3.2 Separate the 2 wires for 15mm from the free end
 - 3.3 Strip the covering from the wires for 3mm and tin.
4. Feed the cable through the square slot in the Browbar.

- Solder the wires carefully to the Dimmer PCB (29). Note the polarity of the wires when reconnecting the LED version – see below. Incorrect connection may result in damage to the LED.



- Fit the Dimmer PCB to the Dimmer Control Body (7) and tighten the nut
- Fit the Dimmer Knob (6) onto the shaft ensuring that the grub screw (30) is positioned over the flat on the shaft. Tighten the grub screw.
- Lay the cable along the recess in the Dimmer Body (7) and hook the body into the Browbar. Fit 3 off No2 x 3/8" PT Screws (17)



Camera Set Up

Please see the Software Set up & Quick Start Guide (EP59-09871) for details of the software set up. This Service Manual assumes that the computer being used has been correctly set up.

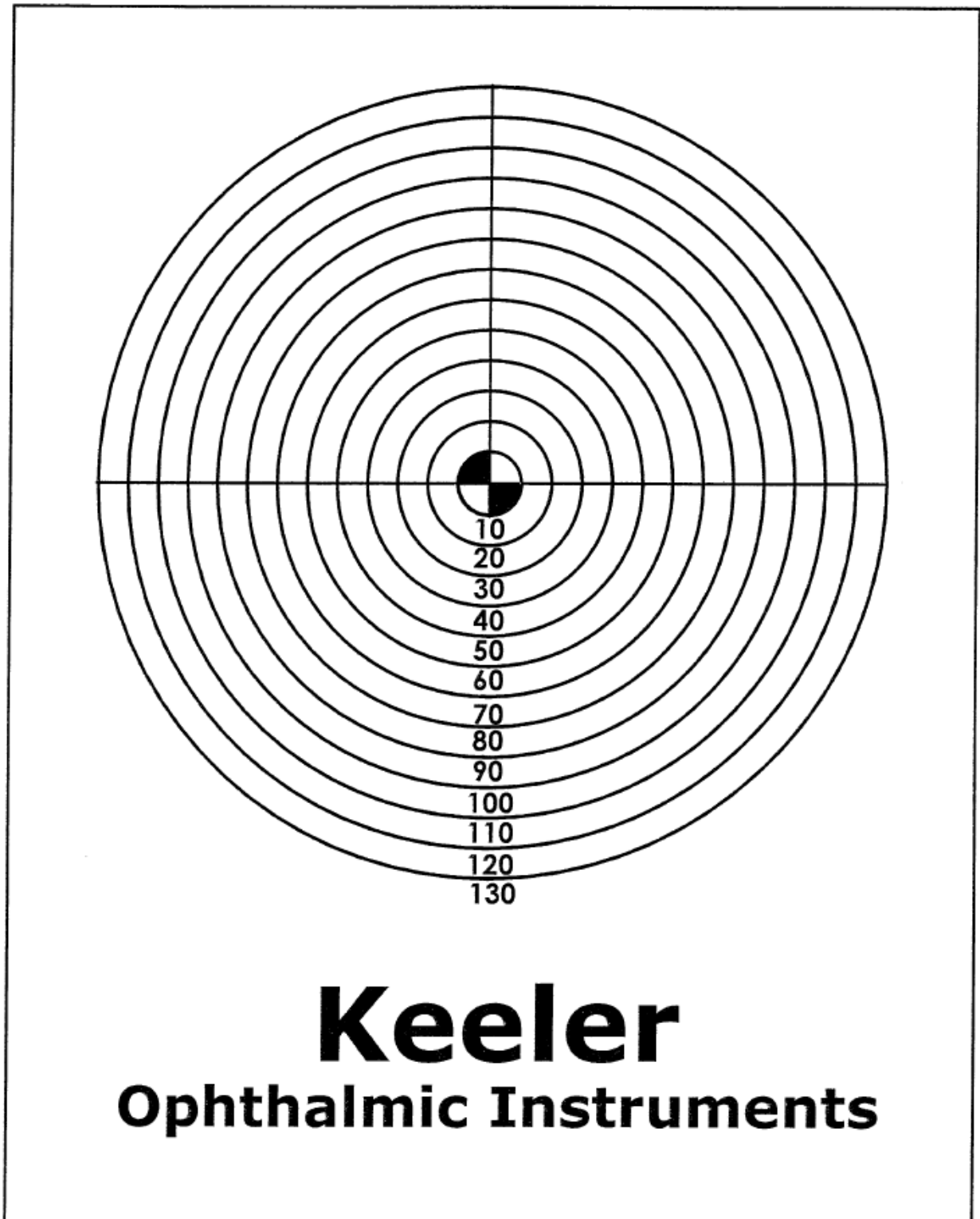
Spare Camera Assemblies have been set up in the factory and it should not be necessary to alter any of the firmware settings.

1. Connect the unit to a PC with the Vantage Digital software loaded and running.
2. Set the Graticule to show the small white light patch
3. Aim the unit at the Target found later in this manual with the unit approx 350mm from the Target.
4. Adjust the main Mirror so that the light patch can be seen on the PC screen. It may also be necessary to adjust the Semi-reflective Mirror vertically to achieve this.
5. The light patch should appear horizontally centred.
6. If it is not centred, adjust the 2 screws shown below one at a time until it is centred.



7. Put the unit on your head and adjust the headband etc to verify that the camera has the same view as the user.
8. Check that the image on the screen is sharp with the front vertical face of the Viewing Optics is between approx 325mm and 375mm from the Target.

Target



Spare Parts

Parts not listed are only available as part of an assembly and are not generally available as spares as they require jigs etc for setting up.

Parts marked with * are only available as part of a spares kit (1202-P-7440).

Current prices for spare parts are available from Technical Service.

Technical Service
Keeler Ltd
Clewer Hill Road
Windsor
Berks
SL4 4AA

Phone +44 (0)1753 827110

Fax +44 (0)1753 827114

Spare Parts List

Item	Part No	Description	
1	EP79-11000	Grommet	*
2	EP39-53721	+2D Eye Lens	
3	EP39-53641	Eyepiece Cap	
4	EP39-70189	Light Shield	
5	EP39-70197	Control Knob	*
6	EP79-09795	Knob Body	
7	EP39-70178	Dimmer Control Body	
8	EP39-70126	Serial No Label	
9	EP39-70174	Metalised Label	*
10	EP79-09621	Plug	*
11	SP72-00001	M2 x 8 Csk PT Screw	*
13	EP29-59777	Browbar	
14	EP39-70191	Spindle Knob	*
15	EP19-70005	Rear Cover Moulding	
16	EP39-70190	P.D. Slider	
17	SP70-25117	No2 x 3/8" PT Screw	*
18	EP39-05121	P.D. Washer	*
19	EP39-53991	Eyepiece Lockring	
20	EP39-24664	Hinge Clamp	
21	EP79-09808	Blue Indicator Pin	
22	EP39-70209	Centre Spindle	
23	EP39-70245	Hinge Spacer	
24	EP39-24656	Hinge Pin	
25	1202-P-5808	Viewing Optics	
26	1205-P-5006	Vantage+ (LED) Illumination Optics	
27	EP39-70215	Spindle	
28	EP39-70332	Bulb Aperture Plug	
29	1205-P-5007	Vantage Plus (LED) Dimmer PCS Assy	

Item	Part No	Description	
30	SP13-00106	M3 x 4 Grub Screw	*
31	1202-P-7483	Front Cover Assy	
32	1202-P-7475	Camera Assy inc USB PCB	
33	SP72-55043	M2.5 x 6 Pozi Pan Hd PT Screw	*
42	EP39-40736	Cover	
43	1202-P-7467	Mirror Mount Assy	
45	1202-P-7459	Semi-reflective Mirror Assy	
46	SP12-00033	M2 X 2 Blk Slit Grub Cup Screw	*
47	SP72-00004	M2.0 x 8 Pozi Pan Hd PT Screw	*
48	EP39-40648	Shaft	*
49	EP39-40621	Cam	*
52	EP39-40509	Label - Vantage Plus Digital	*
	1202-P-7440	Fixing Kit	

