user manual

OE14-122/23

OE14-122/23

Underwater Colour Pan, Tilt and Zoom Camera

User Manual Contents

Sales and Service:
Campus 1
Science and Technology Park
Aberdeen
Scotland

tel: +44 (0)1224 226500 (24 hrs)
fax: +44 (0)1224 226501

Manufacturing:
Airport Industrial Estate
Wick
Caithness
Scotland

tel: +44 (0)1955 603606
fax: +44 (0)1955 607520

KONGSBERG

STANDARD CONDITIONS OF WARRANTY and GENERAL INFORMATION

(The Conditions and Information form part of the Company's conditions of trading)

STANDARD CONDITIONS OF WARRANTY

Instruments sold by Kongsberg Maritime Limited (hereinafter called the 'Company') are warranted only as stated below:

Subject to the exceptions and upon the conditions specified below, the Company agrees to correct, either by repair of at its election, by replacement, any defect of material or workmanship which develops within one year after delivery of the instrument to the original purchaser by the Company or by an authorised representative, provided that investigation and factory inspection by the Company discloses that such defect developed under normal and proper use.

The exceptions and conditions mentioned above are the following:

a. If any component or accessory manufactured by the Company such as glassware, optical components, light bulbs or cable, fails to give reasonable period of time, the Company will, at its election, replace or repair such component or accessory. What constitutes reasonable service and what constitutes a reasonable period of time shall be determined solely by the Company after the Company is in possession of all the facts concerning operating conditions and other pertinent factors and after such component or accessory has been returned to the Company, transportation pre-paid.

b. The Company takes no warranty concerning components or accessories not manufactured by it. However, in the event of the failure of any component or accessory not manufactured by the Company, the Company will give reasonable assistance to the purchaser in obtaining from the receptive manufacturer whatever adjustment is reasonable in the light of the manufacturer's own warranty.

c. The Company shall be released from all obligations under its warranty in the event of repairs or modifications made by persons other than its own or authorized service personnel, unless such repairs by others are made with the prior written consent of the Company.

d. The Company expressly disclaims liability to its customers, dealers and representatives, and to users of it's products, and to any other person or persons for special or consequential damages of any kind and from any causes whatsoever arising out of or in any way connected with the manufacture, sale, handling, repair, maintenance, or replacement of or arising out of or in any way connected with the use of said products.

e. Except as stated above, the Company makes no warranty, express or implied (either in fact of by opt of law), statuary or otherwise: and, except to the extent stated above, the Company shall have no liability under any warranty, express or implied (either in fact or by opt of law), statutory or otherwise.

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

f. Representations and warranties made by any person, including dealers and representatives of the Company, which are inconsistent or in conflict with the terms of the warranty (including but not limited to the limitations of the liability of the company as set forth above), shall not be binding upon the Company unless reduced to writing and approved by a Director of the Company.

g. This warranty shall be governed by the laws of Scotland.

GENERAL INFORMATION

Specifications

The Company reserves the right to change specifications at any time without notice and without incurring any obligation to incorporate new features in instruments previously sold.

Damage in Shipment

The Company's instrument is carefully examined and checked before it is shipped. It should be visually and operationally checked as soon as it is received. If it is damaged in any way, a claim should be filed with the carrier. New or repaired instruments damaged in transit should not be returned to the manufacturer without first obtaining specific shipping instructions.

Repairs

Should any fault develop, the Company or its appointed service agents, must be notified immediately giving full details of the difficulty. Include in the notification the model number and serial number of the affected instrument. On receipt of this information the Company, or its service agent, will send service instructions or shipping data.

Upon receipt of shipping instructions, the instrument must be forwarded, carriage pre-paid, and repairs will be made by the Company or its service agents at their premises. If the instruments is not covered by warranty, or if it is determined that the fault is caused by misuse, repairs will be billed to the customer, and an estimate submitted for customer approval before the commencement of repairs.

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

USER MANUAL

Introduction

Thank you for choosing a Kongsberg Maritime camera. Before using the camera please refer to the encapsulation card provided. Information regarding the safe use of the product and details of the constituent parts of the camera are detailed there for your reference. The items listed on the encapsulation card are classified by Kongsberg Maritime as “first level maintenance items” and as such can be maintained by the operator. Care must be taken, however to ensure that the “O” Rings are lubricated with silicon grease and that no solvents (Alcohol etc) are used to clean the Correction Lens.

Your new camera should give many years of quality service. However, should you experience any difficulties, repair or replacement of the camera will be governed by the Terms & Conditions of Warranty as stipulated.

We recommend that any repairs or fault finding are conducted by Kongsberg Maritime Service personnel. In the interests of personal safety, do not undertake any servicing unless you are qualified to do so.

Product Specification

Click here to view the product specification file as a .pdf file.

Please read the whole manual before operating the camera.

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

Quick Start

Important Note: This product has an automatic initialization routine once switched on. It is essential to allow a 50 second delay after power up before starting the GUI and sending commands via RS232/485. If this routine is not followed, you may see a number of error messages appearing on the screen. This does not indicate a fault condition and the camera will function correctly after the 50 second initiation period. If commands are sent to the camera before the completion of the initialization routine, the function settings highlighted on the GUI will not be in synchronization with camera settings until each particular function is activated.

When you unpack your camera it is recommended that it is tried out on a desk to get some experience in operating it. You should be able to operate it in roughly 5 minutes. First of all take the CD marked 14-122 GUI and User Manual and insert it into a PC. It will auto play and a front screen will be displayed. Click on the GUI option and then click on the install 14-122 GUI icon. The GUI will then install. Follow the on screen instructions while installing the GUI.

Then plug in a suitable cable into the external connector on the camera and wire it up using the wiring information supplied on the encapsulation card. Connect 16-24V d.c. onto the power pin and connect the 0V pin to ground. Connect the video output and screen pins to a VBS connector on a monitor and/or a video capture card on the PC.

Then connect up the RS485/RS232 connection to the 2 serial communication pins on the 14-122. If using RS232 then also connect RS232 0V(or camera 0V if RS232 0V is not available) to the ISO_GND pin on the camera.

Then you are all ready to use the camera. Turn the power on and then press the RS485 button on the remote control. On the controlling PC go into the start menu and select Programs-> Kongsberg Software -> 14-122 GUI. This starts the GUI.

The GUI will ask first of all which comm port (1 – 4) the camera is connected to. Select the correct port. The GUI will then turn on the camera module and all the GUI's functions will become available. Try out the functions of the camera to get used to operating it.

If the GUI fails to initialise then the most common problems are:

1) The 2 serial communications pins on the camera have been wired the wrong way round to the PC.
2) The camera has not been put in the correct mode (RS485).
3) The current limit of the power supply is set too low for the camera.

If the video signal appears incorrect the most common problems are:

1) The display is in the wrong mode (PAL or NTSC).
2) LLD is not set at 0m. Press reset to set to 0m.
3) Video signal screen on the display is not linked to screen on the camera.

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

Remote Control

The remote controls allows for the setting of the control mode and to change the LLD setting to provide compensation for losses in cables. The following table shows the IR functions:

IR Functions

Button	Function
RESET	No LLD
200	200m (665 ft) LLD
400	400m (1330 ft) LLD
750	750m (2500 ft) LLD
800	800m (2660 ft) LLD
1000	1000m (3325 ft) LLD
1100	1100m (3660 ft) LLD
1200	1200m (4000 ft) LLD
1200*	Alternative 1200m LLD
1200#	Alternative 1200m LLD
TRI-STATE	Tri-state Control
BI-POLAR	Bi-Polar Control
USB	N/A
RS485	RS485/232 Control
ON	Termination On
OFF	Termination Off
A	RS485 Network Mode
B	Position Overlay On
C	Position Overlay Off
D	N/A

Figure 1.0

Due to variations in cable quality it may be necessary to experiment with other LLD settings to obtain the best picture.

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

Supplied Software

There is a CD containing several pieces of software supplied with the camera, which is marked 14-122 User manual and GUI. This contains the GUI for controlling the camera, manuals for camera, software and other Kongsberg product information.

To control the camera over RS232/RS485 the 14-122 GUI needs to be installed. When the CD is inserted it will auto play. From it click on software and then click on the GUI icon. Ensure that all other programs are closed down during the installation procedure. If any previous versions of the GUI are installed then they must be uninstalled first.

Please read the GUI Manual for further information

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

RS232/RS485 Control

Important Note: This product has an automatic initialization routine once switched on. It is essential to allow a 50 second delay after power up before starting the GUI and sending commands via RS232/485. If this routine is not followed, you may see a number of error messages appearing on the screen. This does not indicate a fault condition and the camera will function correctly after the 50 second initiation period. If commands are sent to the camera before the completion of the initialization routine, the function settings highlighted on the GUI will not be in synchronization with camera settings until each particular function is activated.

First of all wire up the camera using the information supplied on the encapsulation card. The camera is internally configured to either RS232 or RS485. If using RS485 and the controlling PC does not have a RS485 port then a RS232 <-> RS485 converter is required. Recommend devices include the IC620A-F and IC109A converters made by Black Box, both available from Kongsberg Maritime.

If the camera has not been used before or was last used in a different mode press the RS485 button on the remote control.

The controlling PC should already have the 14-122 GUI installed on it. After a minimum delay of 50 seconds after powering up the camera/pressing RS485, run the GUI. See the 14-122 GUI manual for instructions for operating the GUI.

When finished using the camera exit the GUI and power down the camera.

It is recommended that the camera is returned to Kongsberg Maritime for changing from RS232 <> RS485 control.

If a qualified person is available to change the settings then the following switch settings should be used. All other switches should be left in their current setting. The switches are on the 14-122-6012 PCB (on the upper side).

Switch Settings

Switch	RS485	RS232
SW2/1	OFF	ON
SW2/2	OFF	ON
SW2/3	ON	ON
SW2/4	ON	OFF

Figure 1.1

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

Hardwire Control

Where it is not possible to control the camera with a computer it is possible to control certain functions on the camera using a DC voltage applied to certain pins on the connector of the camera.

First of all wire the camera up using the information given on the encapsulation card, then power up the camera. If the camera has not been used before or was last used in a different mode press the tri-state or bi-polar button on the remote control. There are five functions of the camera that can be controlled by hardwire control. They are zoom, focus, pan, tilt and auto-focus.

Tri-State

Tri-State control is a system whereby each camera function is controlled by altering voltages, with reference to 0V, applied to specific control lines. There is only one control line per function.

Zoom

Applying a voltage of between +8V and +24V to the zoom pin will cause the camera to zoom telescopic. Applying a voltage of between -24V and +4V will cause the camera to zoom wide. Removal of these voltages will cause the camera to stop zooming.

Focus

The focus function is only available when the camera is in manual focus mode. Applying a voltage of between +8V and +24V to the focus pin will cause the camera to focus far. Applying a voltage of between -24V and +4V will cause the camera to focus near. Removal of these voltages will cause the camera to remain at its present focus setting.

Auto-focus

Applying a voltage of between -24V and +4V to the auto focus pin will cause the camera to go into auto-focus mode. This is the normal auto-focus mode and does not use macro mode. An open circuit condition (>100KΩ) will put the camera in manual focus mode. This allows the focus position to be adjusted manually.

Pan

Applying a voltage of between +8V and +24V will cause the camera module to Pan left with respect to looking onto the dome. Applying a voltage of between –24V and +4V will cause the camera module to Pan right. Removal of these voltages will cause the camera to remain in it's present Pan position.

Tilt

Applying a voltage of between +8V and +24V will cause the camera module to Tilt down with respect to looking onto the dome. Applying a voltage of between –24V and +4V will cause the camera module to Tilt up. Removal of these voltages will cause the camera to remain in it's present Tilt position.

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

Bi-Polar

Bi-Polar control is allocated two wires. The circuit is isolated and does not require any ground reference.

Zoom

If the Bi-Polar Zoom (Tele) line is positive by 6-12V with respect to the Bi-Polar Zoom (Wide) then the camera will zoom telescopic. If the Bi-Polar Zoom (Wide) line is positive by 6-12V with respect to the Bi-Polar Zoom (Tele) then the camera will zoom wide.

Focus

The focus function is only available when the camera is in manual focus mode. If the Bi-Polar Focus (Far) line is positive by 6-12V with respect to the Bi-Polar Focus (Near) then the camera will focus far. If the Bi-Polar Focus (Near) line is positive by 6-12V with respect to the Bi-Polar Focus (Far) then the camera will focus near.

Auto-focus

Applying a voltage of between -24V and +4V to the auto focus pin will cause the camera to go into auto-focus mode. This is the normal auto-focus mode and does not use macro mode. An open circuit condition (>100KΩ) will put the camera in manual focus mode. This allows the focus position to be adjusted manually.

Pan

If the Bi-Polar Pan Left Line is positive by 6-12V with respect to the Bi-Polar Pan Right Line the camera will Pan Left. If the Bi-Polar Pan Right Line is positive by 6-12V with respect to the Bi-Polar Pan Left Line the camera will Pan Right.

Tilt

If the Bi-Polar Tilt Up Line is positive by 6-12V with respect to the Bi-Polar Tilt Down Line the camera will Tilt Up. If the Bi-Polar Tilt Down Line is positive by 6-12V with respect to the Bi-Polar Tilt Up Line the camera will Tilt Down.

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

Network Control

Network control should only be used when more than 1 camera is sharing the same RS485 port. It allows for several cameras to be controlled from, the same port, saving PC resources and the flexibility to control multiple cameras from only one piece of software. First of all wire up the camera using the information supplied on the encapsulation card. To ensure data integrity the final camera on the chain needs to be terminated. Use the remote control to turn on the termination resistor (120 ohms) in the final camera in the chain. Turn the termination resistor off for any other camera in the chain. Be careful when using the remote control so that it only changes the setting on the camera that it was intended for, and not on any other cameras close by.

If the cameras have not been used before or were last used in a different mode press the network button on the remote control (button A) for each camera.

The controlling PC should already have the 14-122 GUI installed on it. After a minimum delay of 3 seconds after powering up the cameras run the GUI. See the 14-122 GUI manual for instructions for operating the GUI.

When finished using the camera exit the GUI and power down the cameras.

Important Information Note: For users of multiple OE14-122 / OE14-123 Pan & Tilt Zoom (PATZ) cameras on a single RS-485 Multi-drop network control configuration.

For users who intend to implement RS-485 control protocol interface for the control of multiple networked PATZ cameras, please note a timing limitation in relation to pan and tilt movement commands. This only applies to multiple camera network RS-485 control. Because of timing limitations inherent in the position feedback system for multiple camera operation, there needs to be a timing delay between subsequent pan or tilt movement control commands to prevent data timing errors. There is an in-built delay of approximately 1 second in the camera between a movement control command being received, and a data response being sent. It is recommended that a delay of approximately 2 seconds is incorporated into control routines before allowing subsequent pan or tilt movement commands to be issued. If subsequent movement commands are received before the previous movement/response command has been properly actioned, then the camera head position will "reset" to its default end-stop position, and the camera will start a position initiation routine lasting approximately 50 seconds.

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

Circuit Descriptions

14-122-6011 Motor Board

The 14-122-6011 Motor Board controls the Pan and Tilt Motor's. The PWM signal from the interface board goes into an H-Bridge Circuit. This amplifies the power of the signal and increases drive voltage. H-Bridge gives full power to the motor's at any speed. The current to the motor's is limited to prevent damage to the camera. The board also contains the IR receiver and the sensor to measure Pan position.

14-122-6012 Interface Board

On the underside of the board is the protection circuitry it provides over voltage protection for all inputs to the camera. Transorbs protect from over-voltage, both spikes and steady state voltages. Fuses protect against fault conditions where too much current is drawn. EMC filters are added to suppress EMC emissions. The 2nd purpose of the board is to convert the 16V- 24V supply voltage to a lower voltage that supplies the rest of the circuitry. This includes 12V to the camera module and some electronic components, 5V for powering most of the IC's, Isolated 5V to isolate some input circuitry as to prevent noise on the video line and as a reference voltage for tri-state operation. It separates tri-sate, bi-polar and RS485 signals and sends them to the correct processing IC.

On the top side is the control and video processing circuitry process and amplifies the video signal from the camera. If a long line drive setting has been selected then a series of resistors and capacitors are put in the path of the video signal. These components have the affect of attenuating the high frequency components of the video signal thus compensating for long cable lengths. After this the video signal is buffered to allow it to have the current to go up a long cable and to protect the circuits incase a high voltage spike comes down the cable.

A PIC microcontroller is the main controller. In Bi-polar or tri-state mode it reads in the signals via A/D converts and tells the camera module to zoom or focus. RS485 signals are isolated, converted to TTL logic levels and read into the PIC via its serial port. The command is read in and the action is sent to the camera module or processed internally. The board also contains a humidity sensor to monitor temperature and humidity levels and to deal with signals coming in from the IR remote. A second PIC processes the position feedback information and sends it to the main PIC>

14-122-6013 Connection Board

The 14-122-6013 Connection Board is just used to link the camera module to the rest of the camera.

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

14-122-6012 Protection Circuitry Parts list.

PCB Ref	Description	KML Part number
C1, C2	CAP 3-TERMINAL 4700PF	014-0179
C3	CAP TANT 10U 10%	019-9504
C4, C10, C22, C23	CAP CER 100NF 0805 SM	019-0530
C5, C6, C7, C12, C13, C14	CAP TANT 150U10% SM 16V	019-0532
C8, C15	CAP 3-TERMNINAL 470PF	014-0185
C9	CAP TANT 22U 10%	019-9505
C11	CAP CER 10U 10V 1206 SM	019-9551
C16, C17, C18, C19, C20, C21, C24, C25, C26, C27, C30, C33, C35	CAP 3-TERMINAL 2200PF	014-0181
D1	DIODE SCHOTTKY 3A 40V	046-0501
D2	DIODE SOD106A 30V SM	046-0504
D3	DIODE BYD17D 1.5A 200V	046-0500
D4, D8, D9	DIODE BYD17D 1.5A 200V	046-0500
D5, D10	SUPPRESSOR TRANS SMBJ30	047-0014
D6, D11	SUPPRESSOR TRANS SMBJ15	047-0015
D7, D12	DIODE ZENER 16V 1W ZMY1	047-0506
D13, D14, D18, D19	SUPPRESSOR TRANS SMBJ30	047-0008
D15, D16	SUPPRESSOR TRANS SMBJ12	047-0505
R1, R2	RES 0R0 0805 SM 1% 0.1W	028-0010
R3	RES MET FILM 6R8 1% SM	028-0312
R4	RES MET FILM 5R6 1% SM	028-9282
R5, R9, R14, R17	RES 1K 1W SM MMB0207	028-0327
R12, R13	RES 100R 0805 SM 1% 0.1	028-0148
FS1	FUSE 2A RESETABLE SM	151-0007
FS2, FS3, FS4, FS5, FS6, FS7, FS8, FS10	FUSE RESETTABLE 0.1A SM	143-0045
FS9	FUSE 0-5A SM RESETABLE	143-0030
TC1, TC2	TRIAC BT134W-600D 600V	045-0014

Figure 1.2

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520

Fault Finding

Fault Finding

The printed circuit boards in the camera contain surface mount and other components, which are not user serviceable. It is therefore strongly recommended that the camera be returned to Kongsberg Maritime for service or repair. The camera contains 3 PCB's, 14-122-6011, 14-122-6012 and 14-122-6013.

Wiring Diagram

Click here to view the Wiring Diagram as a .PDF file

Outline Drawing

Click here to view the Outline Diagram as a .PDF file

Sales and Service: Campus 1, Science and Technology Park, Aberdeen, Scotland
tel: +44 (0)1224 226500 (24 hrs) **fax:** +44 (0)1224 226501
Manufacturing: Airport Industrial Estate, Wick, Caithness, Scotland
tel: +44 (0)1955 603606 **fax:** +44 (0)1955 607520