R14

Optical Profile Projector

Operation Manual

Baty International
Victoria Road
Burgess Hill
West Sussex RH15 9LB UK

Tel: +44 (0) 1444 235621 Fax: +44 (0) 1444 246985
E-mail: sales@baty.co.uk Website www.baty.co.uk

1 OPERATION

1.1 INSTALLATION

Your BATY R14 profile projector will, under normal circumstances, be unpacked and commissioned by Baty personnel or one of our worldwide agents. You may however wish to unpack the projector yourself and arrange it in its final operating position.

Should you wish to do this, you should take care to follow the points outlined below: -

- Carefully remove the R14 from its packing. You will find that your accessories and items such as the projector screen are packed separately for safety.
- Make sure that the Rl4 is mounted securely on a suitable bench or table and is resting on its three feet.
- Remove the "U" bracket securing the workstage by releasing the screws at each side of the workstage support and one underneath the chassis.
- The power supply to your R14 must be alternating current and of the correct voltage. You will find a data plate on the right front of the projector chassis giving voltage information and also projector type and serial number.
- Care should be taken not to obstruct the grille at the back of the projector, as this is the outlet for the warm air drawn from the profile lamphouse.
- Covering of the fan grille will result in severe overheating of both the profile and surface illumination lamps.
- It is suggested at this stage that further assembly of the projector be left to Baty personnel or our agents.

1.2 OPERATING CONTROLS

1.2.1 Switches

The ‘mains on’ switch for your R14 is located on the right front of the projector cabinet.

Two further switches are located on the left front of the projector cabinet. The upper switch will enable the main profile illumination lamphouse. The lower switch will enable the projector's surface illumination unit if fitted.

1.2.2 Worktable

Worktable movement is defined by X and Y axes, the X-axis being the horizontal or lateral movement.

The X-axis controls are located on the workstage itself.

The workstage can be moved laterally by means of the handwheel on the far right side of the worktable. If rapid movement over a large distance is required, the fine adjustment may be released by depression of the quick release lever mounted on the workstage to the left of the profile lamphouse.

The worktable Y-axis movement is controlled by means of the large handwheel at the front of the projector.

1.3 OPTICAL SYSTEM

1.3.1 Lenses

Five different lenses are available to provide magnifications of xl0, x20, x25, x50 and xl00. The lens fits into the lens mount directly below the projector screen and is located in position by a thumbscrew in the top left hand (10 o'clock) position locating in a groove in the lens body.

To change a lens, release the screw and draw the lens towards you out of the mount. When inserting a lens, make sure that it is pushed right home and do not over tighten the locating screw otherwise damage may occur.

1.3.2 Focusing

This is controlled by the handwheel at the top right hand of the front casting, you will notice that turning this will move the entire lens mount in or out. This does not, however, affect the magnification that remains constant in any position.

1.4 DIGITAL READOUT SYSTEM

There are different types of digital measuring systems available for your Baty projector. All instructions for operating these units can be found in the separate readout system handbook.

1.5 SCREEN

Remove the glass screen from the packing, use cotton gloves or avoid touching the screen with naked fingers. Remove the bottom left screen roller and place the screen so that it is against the other screen roller and screen rotation knob. Ensure that the ground side of the glass is facing outward. Push the screen back into position whilst mounting the bottom screen roller on the spigot. Replace the retaining screw and ensure the screen rotates freely.

The projector screen may be rotated through 360^0 by using the knob located alongside the screen at the 4 o'clock position.

There are four separate overlay chart clips located on the screen that are used to hold charts and/or the auto edge detector in position on the screen, if this option is fitted.

1.6 PROJECTING AN IMAGE

1.6.1 Profile Illumination

- Firstly switch on the main switch followed by the profile illumination switch.
- Place your component on the projector workstage.
- You can now position the component in front of the light beam by adjusting the workstage X and Y axes.
- When your object is visible on the screen you can focus the image by moving the small focusing handwheel as described in section 1.3.2.

1.6.2 Surface Illumination

If this option is fitted to your R14, you can use it by switching on the unit as described in section 1.2.1 and moving the adjustable fibre-optic units so that they illuminate the surface of your component.

1.6.3 Helix Adjustment

Built into the R14 is a unique lamp adjustment for setting a helix angle by turning the small knob in the centre front of the lamphouse.

To project a screw thread, place the component between centres or on a vee block and focus it's image on the screen. Now throw the image slightly out of focus by moving the projection lens towards the component.

A bright out-of-focus image will appear around the outline of the thread form, but this image will not be symmetrical about the right and left flanks of the thread form.

Turn the helix adjustment knob and observe the out-of-focus image movement, then adjust the knob until the image is symmetrical about the thread form. The light beam is now correctly aligned with the helix angle and you can now re-focus your object on the screen.

Before returning to other work, the light beam must be re-aligned. This can be achieved by removing the projection lens and checking that the lamp filament image is central on the screen.

1.7 MEASURING AN IMAGE

Your projector is fitted with linear encoders that register the distance moved by the workstage along both axes to a resolution of 0.001mm. A digital readout system will be supplied with your Baty R14. Ensure the encoder cables are connected to the digital display. As the workstage is moved, the digital display will show the measurement. You will find all relevant operating instructions given in the separate readout unit handbook.

1.8 DIGITAL ANGLE MEASUREMENT

The electronic angle measurement system permits rapid measurement of angles 0-180° in degrees and minutes, e.g. 10°45' or decimal degrees, e.g. 10.75°.

1.8.1 Measuring an Angle

1.8.1.1 Rotate the projector screen carrying the cross lines to align one of the cross lines to one flank of the angle to be measured. Zero the display by pressing the RESET button (Fig.1)

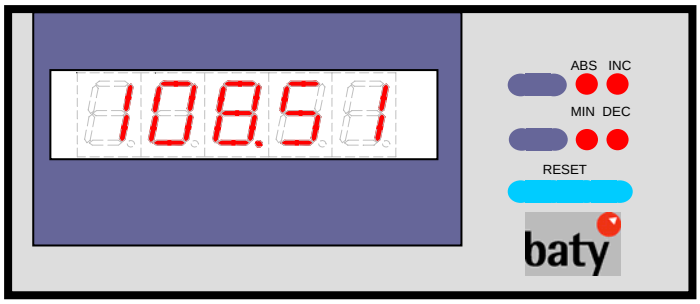


Figure 1 - Digital Angle Display

1.8.1.2 Rotate the screen until the same line is aligned with the second flank. Read off the measured angle.

1.8.2 Degrees/Minutes or Decimal Degrees

1.8.2.1 If the red "MIN" L.E.D. (Fig.1) is illuminated, the reading will be in degrees and minutes, e.g. 112°45'. To convert to Decimal Degrees, press MINS/DEC button (Fig.1). The display will change to degrees and .01 steps of a degree 112.75°.

1.8.2.2 The red "DEC" L.E.D. (Fig.1) will be illuminated. Each successive pressing of MINS/DEC button, (Fig.1) will change the mode and convert the reading.

1.8.3 Absolute or Incremental Measurement

1.8.3.1 Press ABS/INC button (Fig.1), to change from Absolute to Incremental measurement and vice-versa. When in absolute mode the ABS L.E.D. (Fig.1) will be illuminated. When in incremental mode the INC L.E.D. (Fig.1) will be illuminated.

1.8.3.2 When in incremental mode, successive angles may be measured, zeroing the counter between each measurement. Pressing the ABS/INC button (Fig.1) at the end of the measurement sequence will display the total angle from the first datum.

1.8.4 Setting the Cross Line Parallel to X-Y Axis

1.8.4.1 Align the cross line on the screen to the zero datum cursor at the edge of the screen (Fig.2), making sure that the cross line is set equidistant between the two cursor lines which have been pre-set during manufacture. Zero the display by pressing the RESET button.

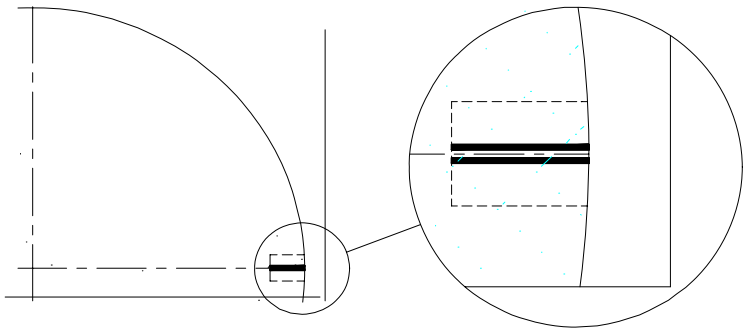


Figure 2 - Cross Line Alignment

1.8.4.2 This procedure should be adopted before attempting measurement in the X and Y co-ordinates.

1.8.5 Recalibration of Angle Display

This procedure should be adopted before attempting angle measurements.
The system may be calibrated as follows:-

1.8.5.1 Switch off power supply to "angle display" by separate "protractor" switch if fitted, or mains switch. Wait two minutes, during which set the cross lines very precisely to the zero datum cursor (Fig.2).

1.8.5.2 Whilst pressing buttons ABS/INC (Fig.1) and MIN/DEC (Fig.1) simultaneously, switch power on the "angle display". Note display shows CAL. Release buttons and display shows 00000. Rotate the screen steadily for a full 360° and set cross line precisely to the zero datum cursor. Note that the displayed figures have no specific relationship to a measured reading at this time, press the RESET button (Fig.1). Display shows 00000 and is now recalibrated and ready for use.

1.8.5.3 The Protractor display unit has a 24 hour Clock function. To set the clock, switch off the main power switch, hold in the RESET button and the ABS button together and switch on the mains power switch. “SET” will be displayed then the Hours digits will flash. Release the RESET button first then the ABS button and the Hours digits will remain flashing. The ABS button may now be used to select between hours and minutes and the MIN button may be used to change the value of the selected numbers. When settings are com;lete the clock may be started by the RESET button.

1.9 EXTERNAL EDGE SENSOR

If your R14 is fitted with an edge sensor system, this may be mounted externally, by the customer. The Edge Detector Probe is mounted in the middle of a Perspex Beam and the beam can be held at a convenient position on the screen by spring clips which are provided as standard. For further details of the use of the external edge detector consult the DRO handbook.

1.10 INTERNAL EDGE SENSOR

If your R14 is fitted with an edge sensor system, this may be mounted internally, as a factory fitted option. In order for the unit to operate correctly the green light filter supplied with your new projector may have to be removed.

- When using the xl0 magnification lens, the green filter may be used.
- When using the x20, x25 and x50 magnification lenses, please remove the green filter.
- It is unlikely that the edge detector will operate at x100 magnification.

1.11 SWING PROFILE LAMPHOUSE

The object of the Swing Profile Lamphouse is to enable long items to be inspected using the surface illumination system and to ease the loading of bulky items onto the workstage area.

The lamphouse can be moved out of position by removing the lock pin from the right hand side of the unit and swinging the top half of the unit to the left.

Before doing so, it is recommended that the power to the profile lamphouse is switched off.

1.12 OPTIONAL ACCESSORIES

The full range of optional work holding attachments and related equipment is explained fully in the Baty sales literature.

Before measuring a component, it will be necessary to hold it rigidly on the projector workstage and square to the optical axis.

All Baty work holding attachments will locate in the worktable slot for precise placement of components.

1.13 RELIABILITY

Now that you are aware of how to operate your Baty R14 you would benefit by referring to the next section related to care and maintenance in order to obtain accurate and consistent results and ensure years of trouble free use.

2 CARE AND MAINTENANCE.

2.1 ROUTINE MAINTENANCE

2.1.1 Care in use

Care should be taken not to scratch the optical components of the system. Ensure that Stage clamps are removed before operating the system. Damage to the workstage can occur if the stage is obstructed during its movement.

Keep the workstage surrounding area free from any obstruction.
Do not clean the Lens or the Glass Screen with inappropriate or abrasive materials.
Do not drive the lens into objects on the stage.
Do not use excessive force to slide the workstage.

It is suggested that you should attempt to keep your projector in as clean an environment as possible.

2.1.2 Cleaning the screen.

We recommend you keep your Projector in a clean environment and ensure that its screen is kept free from contamination and cleaned regularly using a mild detergent, also, a proprietary glass cleaner may be used on the screen.
Should dust accumulate on the screen, it is best brushed off to avoid scratching the surface.

2.1.3 Workstage

Keep the workstage surface free from dirt and abrasive dust. Wipe bright ferrous parts with light oil weekly. Should the glass screen be broken or badly scratched, a replacement can be obtained from Baty International or your local Baty distributor. (See the replacement parts list, 2.4).

2.1.4 Mirror.

Normally, it would not be necessary to clean mirrors more than once a year. If you find you need to clean them more regularly, you should consider relocating the Projector to a place where atmospheric conditions are less hostile.

Access to the mirror can be gained by removing the glass screen. Gentle dusting with a large camel-hair brush should be sufficient. Further cleaning could be carried out using a mild detergent such as Teepol and tepid water with a pad of surgical, lint-free cotton wool. Clean the mirror with damp (not saturated) pads. Use as many pads as necessary to ensure a soiled pad is not used on a clean area. Remove any detergent residue using pads damp with clean water. Finally, dry the surface using more pads.

Mirror surfaces must be treated with extreme care at all times.

2.1.5 Lenses

Dust should be removed with a soft camel hair brush. Further cleaning may be carried out with special lens polishing cloth or cleaning fluid. Any other method of cleaning is likely to result in damage.

2.1.6 Software

During the life of the system periodic adjustments may be required to ensure that the projector performs consistently. Operating parameters in the Digital Readout software may need to be adjusted, this should only be carried out by personnel approved by Baty International, preferably when the system receives its periodic maintenance or calibration check.

2.1.7 Accessories

Components must be held rigidly on the workstage prior to taking measurements. When fitting accessories, always ensure that the surface of the workstage, sides of the slot and all locating aces of the accessory are free from dirt, grit and abrasions. Accessory clamps must not be over tightened.
Information on the full range of component holding attachments and related equipment is available from our sales literature. We also welcome enquiries regarding application specific holding attachments.

2.1.8 Optional Extras

Jigs and Fixtures, Rotary Axis Workstage and various other accessories are available from Baty International.

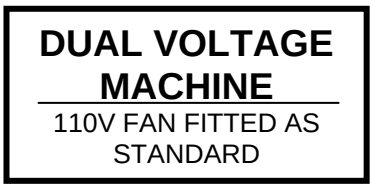
Please contact Baty International or their approved representatives for advice on use with your application.

2.1.9 Special or Application-Specific Facilities

These systems can be supplied with Application Specific Fixtures or Facilities. All documentation supplied with any special to type or application specific facilities should be read in conjunction with this Manual with particular attention to any safety details.

2.1.10 DUAL VOLTAGE OPERATION

As of February 2000, R14 Projectors can be internally switched for operation on 110 or 240 Volts.
These projectors will be identified by a label above the fan, at the rear of the machine.



Please note that a 110v fan is fitted to all dual voltage units and the Synatel Protractor readout unit is wired to run at 110v directly from the transformer .
These items do not change when the operating voltage is switched.
When changing operating voltage it is necessary to change the fuse to the correct rating. 220-240V use a 2Amp fuse. 110V use a 5A fuse.
See notes on safety at the end of this document.

Electric shock hazards, 240V AC, exist inside the equipment.

Check the operating voltage of the system before connecting to the main supply.

To Change the operating voltage:

1) **disconnect the projector at the main supply**

2) change the fuse to the correct type for the intended operating voltage
220-240V use a 2Amp fuse. 110V use a 5Amp fuse.

3) remove the screen

4) select voltage on the switch above the transformer

5) replace screen

6) fit correct mains plug according to customers supply requirement

Machine is now set for alternative voltage.
Note that the serial Number plate will show the voltage originally set at the factory.

2.2 LAMP REPLACEMENT

WARNING: DO NOT CHANGE A BULB WITH THE POWER SUPPLY SWITCHED ON.

Before opening any covers, always switch off the system and isolate the system from the main voltage supply

Allow the lamp to cool before attempting to remove it.

Replace lamp, ensuring that the surface of the bulb is not touched with your fingers.

Refer to the lamp unit details in the document package.

2.2.1 Lamp Type

There are two halogen lamps used in the RI 4 Projector, with the following ratings:

Lamp	Rating	Ref. No.
Profile Illumination	12V 100W	Ref. 247-005
Surface Illumination	12V 100W	Ref. 247-064

All lamps should be obtained from Baty International.

2.2.2 Replacing the Profile Illumination Lamps

Remove the lamphouse cover; it is retained by two small knurled nuts on the front face of the lamphouse unit.

Take out the old lamp by drawing it upwards and fit the new one, making sure that the pins engage properly in the holder. Do not handle the glass envelope, as the fingers will leave traces of grease causing the glass envelope to deteriorate. If contaminated, clean the glass envelope with a solvent such as methylated spirit (see instructions supplied with new lamp).

You should now check that the lamp is at the right height. Take out the projection lens altogether and switch on. Do not look directly at the lamp when it is on. On the screen, you will now see an enlarged image of the lamp filament; if necessary you can sharpen this by adjusting the upper control on the forward face of the lamphouse. The filament image should be central on the screen - this can normally be judged with sufficient accuracy by eye: If it is not central, release the socket head screw directly below the lampholder, which will allow a small amount of vertical movement. Retighten the screw before replacing the cover.

At the same time, you can set the filament laterally using the lower control knob. Finally, re-collimate the light beam as described in the section entitled Profile Illumination (1.3.1).

2.2.3 Replacing the Surface Illumination Lamp

To obtain access to this lamp it is necessary for the glass screen to be removed. Remove the screw from the bottom left hand nylon screen roller, support the glass screen with one hand and withdraw the nylon roller and glass towards the operator thus removing it.

Looking through the screen aperture into the cabinet of the R14 a black knob almost between two brown wires is located approximately 185mm (7¼") in front of the main mirror. Rotate the knob clockwise and at the same time withdraw upwards and towards the mirror.

A unit housing the Surface Illumination Lamp, from which the fibre optic cables emerge, will now be separated from the chassis of the R14 and may be withdrawn to the screen aperture for easy access. (Note the position of the lamp for ease of replacement with the new lamp).

Attached to the lampholder is a lamp ejector arm; pull the arm up away from the plate thus ejecting the lamp.

Select the replacement lamp, taking care not to touch the glass envelope with one's fingers.

Push the ejector arm back down until it is parallel with the plate from side view.

2.3 REPLACING NON CONSUMABLES

Should it become necessary to replace any non-consumable items it is suggested that you should refer to the manufacturer to avoid any damage occurring to your projector. If new lenses are purchased, instructions for setting the lens magnification can be obtained from Baty International.

2.4 SYSTEM CALIBRATION

2.4.1 The system will already be calibrated but should be checked by a Baty Engineer to ensure the unit is free from transit damage or movement.

2.4.2 **Recalibration**

Baty International recommends that our own service engineer or an authorised representative of Baty International re-calibrates your projector every 12 months. This is because they are equipped with high accuracy calibration masters and are practised in the art of accurately calibrating these machines in accordance with Baty Procedures against which Baty will issue a calibration certificate.

No calibration certificate can be issued by Baty for any third party calibration.

Should you have the facilities to do this, your Projector may be calibrated following the Baty procedure.

A full calibration kit may be purchased from Baty International or your local Baty representative. Included in this kit will be a copy of Baty International standard calibration procedure.

2.5 SERVICE

Baty International recommends that this system is covered by periodic maintenance service including a calibration check. This is important to ensure you have reliable measurement capability throughout the life of the Projector and to enable the user to take full advantage of operating with the latest version and any new facilities of the Digital Readout software.

LIST OF REPLACEMENT PARTS

One set of spare lamps and fuses is supplied with each system. Parts are available from Baty International or your local Baty distributor.

Part Description	Baty Ref. No.
Lens x1O Magnification	122-600
Lens x2O Magnification	122-601
Lens x25 Magnification	122-602
Lens x5O Magnification	122-603
Lens x100 Magnification	122-604
Profile Lamp	247-005
Profile Lampholder	247-021
Surface Illumination Lamp	247-064
Surface Illumination Lampholder (with bullet connectors)	247-068
Green Filter	SA-362
Screen Clip	51-344
Screen with crossline markings	52-373
Screen clips	51-344
Drive tyres (set of 3)	52-124
Drive knob	SA-244
Screen rollers (set of 2)	52-457-1
X axis Glass Scale	52-500
Y axis Glass Scale	52-501
Fan 110V ac	202-232
Leadscrew Assembly X-axis (complete unit)	SA-263
Leadscrew X-axis	52-303
Leadscrew Y-axis	51-448
Handle Y-axis	51-453
Handle spinner Y-axis	52-364
Surface Illumination Fibre Optic	SA-361
Terminal Block Lamp House	255-031
Profile Condenser Lamphouse	340-004
Focus Block and Nut High Magnification	52-159
Main Mirror	52-392
Transformer	248-008
Rise and Fall Assembly	SA-126
Half Nut	52-307
Digital Angle Display	770-307
Angle Encoder (complete assembly)	52-464
Focus Leadscrew Assembly	52-159/51-342
Mains Power Switch 220V	249-027
Mains Power Switch 110V	249-022
Switch Panel	52-399
Mains Switch Panel	52-400-1
Fuse Holder	247-036
Fuse 5 Amp	247-055
Reference Probe, Edge Sensor	202-1234
Screen Probe (2 metre) Edge Sensor	202-1235
Screen Probe Mount	54-389
Internal Edge Sensor Probe	52-525
Focus Leadscrew	51-342
Green Filter (Dark)	SA-140-C
Workstage	51-240

3 SAFETY

3.1 Always obey the safety instructions detailed in this document. Do not attempt to install or use this equipment before reading this manual.

3.2 All users and maintainers of this equipment are to be familiar with these instructions that safeguard both the equipment and the user.

3.3 Baty International accept no liability for damage to the system or injury incurred resulting from incorrect use or incorrect installation by persons other than Engineers approved by Baty International.

3.4 Ensure that the system is installed as detailed in this manual and associated documents.

3.5 Always switch off the system and isolate the system from the main supply before opening any covers.

3.6 Electric shock hazards, 240V AC, exist inside the equipment.

3.7 Check the operating voltage of the system before connecting to the main supply. Note that the serial Number plate will show the voltage originally set at the factory.

3.8 Ensure that the system is operated in accordance with the procedures and safety instructions detailed in this manual and associated documents.

3.9 When changing the surface illumination bulb it is necessary to access the bulb by removing the screen. Do not change bulbs with the system switched on.

3.10 This bulb runs very HOT. Always allow the bulb to cool before removing it. Never touch the new bulb or the mirror surface with bare hands. If touched with bare hands or stains are found, clean the bulb or reflector surface with alcohol.

3.11 Switch off power when mounting the lamp.

3.12 Do not subject the lamp to impact during use, as it will shorten the life.

3.13 The heavy weight of this projector requires appropriate lifting and handling facilities and at least two persons.

4 CONFORMITY.

This Product, in its standard factory configuration, is supplied in compliance with EU Directives on EMC and Safety.

In accordance with requirements of EMC Class A compliance, this declaration of conformity hereby notifies the user that:
Some configurations of this equipment when sold with Electronic DRO's or Computer Equipment, may cause some close proximity low level Radio Interference.

CONFORMITY

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Application of Council Directives:	73/23/EEC	Low Voltage Directive.
	89/336/EEC	EMC Directive.

Standards to which conformity is declared:
CISPR 22 Class A, EN 55022-1 Radiated and Conducted emissions.
EN 50082-1 Immunity.

This Equipment is also Y2K compliant.

Type of Equipment:	**OPTICAL PROFILE PROJECTOR.**
MODEL:	**R14** (All Models).
Manufacturers Name:	Baty International.
Manufacturers Address:	Victoria Road, Burgess Hill, Sussex. RH15 9LB. England.
DATE:	05 December 2001.

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5 WARRANTY AND LIABILITY

5.1 WARRANY

Baty International provides one years warranty from the date of shipment of this product from Baty International's Factory.

5.2 LIABILITY

5.2.1 Baty International accepts no liability for malfunction, injury or damage if: The Safety, Handling, Installation and Operating instructions in the Manual and associated documents are not obeyed, the product is not properly installed in accordance with the Baty International 's instructions, the product is not used correctly as specified by Baty International, the product is used when in a faulty condition, that the product is used without all its enclosure covers properly fitted, the product is used in any way which exceeds its operating parameters or could be considered as abuse, the product is not maintained and serviced in accordance with Baty International recommendations, the product is not commissioned and serviced by qualified personnel approved by Baty International, replacement components do not conform to Baty Internationals specifications or are not supplied or authorised by Baty International.

5.2.2 In no event shall Baty International or its suppliers be liable for any special, incidental, or consequential damages whatsoever (including without limitation, damages for loss of business information or productivity) arising out of the use or inability to use this equipment.

5.2.3 Baty International reserves the right to change the information on products and in documentation without notice in line with the policy of continued product improvement and development. Some illustrations and photographs in documentation may not reflect precisely what is delivered due to different configurations and product issues. The information contained in this document is considered to be correct at the time of printing. It is supplied without liability for errors or omissions.


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