



IntelliXcap

User Manual

Part Number 319430 Rev. A

DOMINIQUE DUTSCHER SAS



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IntelliXcap User Manual

Revision	ECO Number	Date	Explanation of Changes	Author
Revision A	EC108867	12/19/2018	Initial completion of the manual template.	A. Kleen

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1. Safety

 WARNING Read the Safety Chapter	
<p>Failure to review the <i>Safety</i> chapter and follow the safety warnings can result in death or serious injury.</p> <ul style="list-style-type: none">• All personnel involved with the operation or maintenance of this product must read and understand the information in this safety chapter.• Follow all applicable safety codes of the facility as well as national and international safety codes.• Know the facility safety procedures, safety equipment, and contact information.• Read and understand each procedure before performing it.	

NOTICE
<p>It is the responsibility of each person working on this product to know the applicable regulatory safety codes as well as the facility safety procedures, safety equipment, and contact information.</p>

This product is intended for use by industrial customers and should be serviced only by Brooks or Brooks trained representatives. The service manuals and related materials are provided in English at no charge and are intended for use by experienced technicians. It is the responsibility of the user to obtain and assure the accuracy of any needed translations of manuals. If you require assistance please contact Brooks service department. Contact information can be found at www.brooks.com.

If additional safety related upgrades or newly identified hazards associated with the IntelliXcap are identified, Brooks Technical Support notifies the owner of record with a Technical Support Bulletin (TSB).

Explanation of Hazards and Alerts

This manual and this product use industry standard hazard alerts to notify the user of personal or equipment safety hazards. Hazard alerts contain safety text, safety icons, signal words, and color.

Safety Text

Hazard alert text follows a standard, fixed-order, three-part format.





- Identify the hazard,
- State the consequences if the hazard is not avoided,
- State how to avoid the hazard.

Safety Icons

- Hazard alerts contain safety icons that graphically identify the hazard.
- The safety icons in this manual conform to ISO 3864 and ANSI Z535 standards.

Signal Words and Color

Signal words inform of the level of hazard.

	<p>Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p> <p>Danger signal word is white on a red background with an iconic exclamation point inside a yellow triangle with black border.</p>
	<p>Warning indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p> <p>Warning signal word is black on an orange background with an iconic exclamation point inside a yellow triangle with black border.</p>
	<p>Caution indicates a hazardous situation or unsafe practice which, if not avoided, may result in minor or moderate personal injury.</p> <p>Caution signal word is black on a yellow background with an iconic exclamation point inside a yellow triangle with black border.</p>
	<p>Indicates a situation or unsafe practice which, if not avoided, may result in equipment damage.</p> <p>Notice signal word is white on blue background with no icon.</p>

Alert Example

The following is an example of a *Warning* hazard alert.

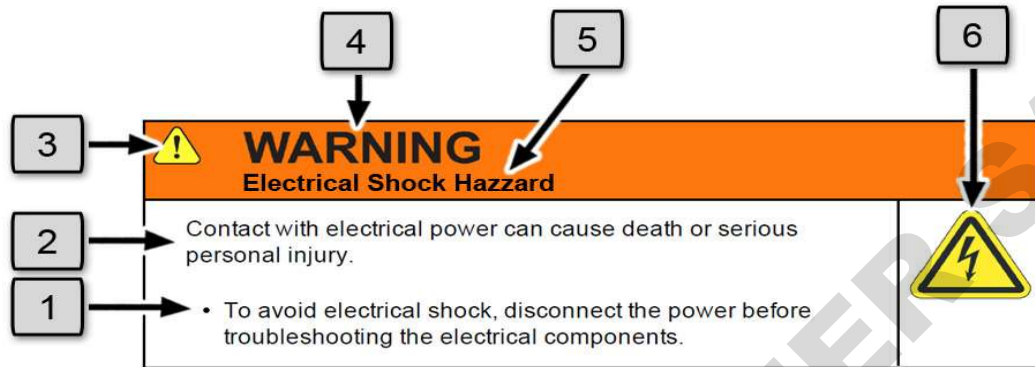


Figure 1-1: Components of a Safety Alert

Number	Description
1.	How to Avoid the Hazard
2.	Source of Hazard and Severity
3.	General Alert Icon
4.	Signal Word
5.	Type of Hazard
6.	Hazard Symbol(s)

Regulatory Compliance and Declaration of Conformity (DoC)

The IntelliXcap meets the requirements of the European Union's Machinery Directive 2006/42/EC and 2014/30/EU as a completed machine. In accordance with the Directive, Brooks Automation has issued a Declaration of Conformity and the IntelliXcap has a CE mark affixed.

	Declaration of Conformity For the European Union	Document #: 297745 Rev.: C
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Description: IntelliXcap - screw cap tube decapper.

Function: The IntelliXcap is designed to remove and replace caps from tubes with screw caps in a rack on closed set tubes in specific rack types.

Product code: 46-8010, 46-8011, 46-8012

Business name and full address of the manufacturer of the machinery:
Brooks Automation Limited, Northbank, Irlam, Manchester M44 5AY, United Kingdom

The manufacturer declares:

- That this machinery fulfills all the relevant provisions of Directive 2006/42/EC (Machinery Directive)
 - EN 12100:2010 Safety of machinery. General principles for design. Risk assessment and risk reduction
 - ISO/TR 14121-2:2012 ED2 Safety of machinery. Risk assessment. Practical guidance and examples of methods
 - EN 60204-1:2006+A1:2009 Safety of machinery. Electrical equipment of machines. General requirements
- That this machinery fulfills all the relevant provisions of Electromagnetic Compatibility Directive 2014/30/EU
 - EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements (Class A equipment)
- That this machinery is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
 - EN 50581:2012. Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Signed for and on the behalf of Brooks Life Science Systems



Print name: Robin Grimwood
Position: Vice President and General Manager
Place: Irlam, Manchester
Date: 19.01.2018

Form: QMS100364 Rev E

General Safety Considerations

NOTICE

Moving parts are subject to pressure and weight. Do not rest a hand on the stage or twist the rack as it may pull the machine out of position or damage moving parts.

NOTICE

The IntelliXcap should be kept clean at all times, please see "Cleaning" on page 28 for information on cleaning requirements.

NOTICE

The IntelliXcap can only be used with tubes and cartridges that have been configured and tested. Do not use alternative tubes and cartridges that have not been configured and tested.

NOTICE

Untrained or Improperly Equipped Personnel

Untrained or improperly equipped personnel performing this procedure may cause damage to the equipment.

- Only Brooks Automation trained personnel should perform this procedure.
- Personnel performing this procedure must read and understand this procedure and have the proper tools and supplies ready before starting.
- Personnel performing this procedure must know the applicable safety codes, facility safety procedures, safety equipment, and emergency contact information.





CAUTION



Inappropriate Use



Use of this product in a manner or for purposes other than for what it is intended may cause equipment damage or personal injury.



- Only use the product for its intended application.
- Do not modify this product beyond its original design.
- Always operate this product with the covers in place.



 CAUTION Damaged Components	
<p>The use of this product when components or cables appear to be damaged may cause equipment malfunction or personal injury.</p> <ul style="list-style-type: none">• Do not use this product if components or cables appear to be damaged.• Place the product in a location where it will not get damaged.• Route cables and tubing so that they do not become damaged and do not present a personal safety hazard.	

 CAUTION Pinch Point	
<p>Moving parts of the product may cause squeezing or compression of fingers or hands resulting in personal injury.</p> <ul style="list-style-type: none">• Do not operate the product without the protective covers in place.	

 WARNING Electrical Shock Hazard	
<p>Contact with electrical power can cause death or serious personal injury.</p> <ul style="list-style-type: none">• To avoid electrical shock, disconnect the power before troubleshooting the electrical components.	

 WARNING Chemical Hazard	
<p>The IntelliXcap may be used to de-/recap samples that expose users to chemical hazards which, if not properly handled, may result in death or serious injury.</p> <ul style="list-style-type: none">• Read and understand the safety information for the equipment where the IntelliXcap is used.• Know the location of the Safety Data Sheets (SDS) in your facility. (also known as Material Safety Data Sheets - MSDS)• Become familiar with the proper handling of material in the environment of the robot.	

Safety Functions

The use and operation of the machine must only be initiated when all safety functions are fully present and in an operable condition. Defective safety functions and protection equipment may lead to unsafe and hazardous situations. In case that a risk to safety is found, do the following:

1. Stop the machine immediately: it can be brought to a safe stop by either the touch screen, activating the Cancel-function, or by the emergency stop button.
2. Disconnect the supply sources to prevent the IntelliXcap from restarting.

E-Stop

The emergency stop button is a safety device designed for use as a complementary protective measure. As an example, the operator can press the emergency stop function to cease all mechanical movement of the IntelliXcap if a hazardous situation arises that could cause personal injury, or damage to the machine or equipment.



When activating the emergency stop button, the status will appear on the operator monitor: *Error 238 – Emergency stop*

Test the emergency stop function before commissioning the IntelliXcap for use and after each installation or re-installation.

At minimum, the function must be visually checked and activated at least every six months.

Safety Switch

There is a safety switch installed on the access door that, if the door is not completely closed, the IntelliXcap will not function. Opening of the access door while tool is in use initiates an immediate stop function of all moving parts.

This function protects operators against hazardous moving parts accessible through the front of the IntelliXcap.






Figure 1-2: Access Door

NOTE: The access door can be disabled from the touch-screen, if the user makes sure that another safety measure takes over. For example, when the IntelliXcap is integrated into a robotic cell with its own safety system, please see [Appendix A on page 41](#) for further information on using the IntelliXcap within an Integrated system.

When the IntelliXcap is commissioned and starts functioning, the automated door will close, the status message will appear on the operator monitor: *Initializing please wait*

The safety door must be activated and tested before commissioning the machine for use.

NOTE: At minimum, the safety door should be visually checked and activated at least once a day.

 WARNING Lockout / Tagout	
<p>Working with energized equipment may cause sudden movement or electrical shock and may result in death or serious injury.</p> <ul style="list-style-type: none">• All energy must be removed from the equipment per the facility's Lockout/Tagout procedure before servicing.• If local procedures are not available, follow the procedure for Lockout/Tagout in OSHA Standard 29CFR 1910.147.	 



2. Overview

This manual describes the proper use of the machine.

The IntelliXcap is a new generation of sample-tube de-/re-capper, which is comprised of a basic chassis assembly and a screwing-head module. This includes interchangeable cap-driver cartridges that allow the user to change the tube type to de-capped without the need for tools.

The IntelliXcap is equipped with a light curtain which reduces the risk of damage to tubes, samples and the instrument that could be caused by failed de-capping / capping or the use of incorrect consumables. The IntelliXcap can be controlled manually or can be integrated into an automated robotic system using a serial command set. The IntelliXcap can work with a range of tube types – a specific cartridge is required for each different cap design format. The current list of available cartridges can be seen in [Appendix B on page 42](#) or contact your local sales representative to request a cartridge for your specific storage tube.

Using this Manual

 WARNING Read the Safety Chapter	
<p>Failure to review the <i>Safety</i> chapter and follow the safety warnings can result in death or serious injury.</p> <ul style="list-style-type: none">• All personnel involved with the operation or maintenance of this product must read and understand the information in this safety chapter.• Follow all applicable safety codes of the facility as well as national and international safety codes.• Know the facility safety procedures, safety equipment, and contact information.• Read and understand each procedure before performing it.	

The IntelliXcap is intended for use in a laboratory environment by trained laboratory personnel and should be serviced only by Brooks or Brooks trained representatives. The manuals and related materials are intended for use by trained and experienced technical personnel.

The manufacturer accepts no liability for any other use of the equipment or its individual parts and components. This also applies to service and repair work carried out by unauthorized service personnel. All warranties are declared null and void in the event of non-compliance with these instructions. This also applies to parts not directly affected by any unauthorized repair work.

This manual contains information on safety, specifications, and operation as well as troubleshooting and maintenance of the IntelliXcap. If there are any questions regarding this manual or use of this system or to order additional copies of this publication, contact Brooks Automation Service. See ["For Technical Support:"](#) on page iii.

Concepts and Terminology

The concepts and terminology defined in the section are used throughout this document. Users should read this section first before continuing with the manual.

Terminology

Word	Definition
Caps	Screw caps
Cycle	The process of first de-capping and then re-capping a rack of tubes = 1 cycle.
De-cap	Unscrew the caps of the sample-tubes.
Instructed person	A person having received the necessary training to carry out a task in a safe and responsible way.
Light Curtain	System for detecting the height of tube rack on the stage.
Recap	Screw the caps back onto the sample-tubes.

Product Illustration

46-8012 – IntelliXcap 96



46-8011 – IntelliXcap 48



46-8010 – IntelliXcap 24



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3. Specifications and Site Requirements

Specifications

Unit Software and Firmware

Table 3-1: Software and Firmware

Software/Firmware	Version
Controller	44
Display	00.14

Site Requirements

Space Requirements

Ensure enough space is available to accommodate the ejected stage platform. The machine has a square footprint and is regarded as highly stable. Place the IntelliXcap in a well-ventilated area on top of an even surface, solid enough to carry its weight. The surface must comply with 1.3.1 of Annex I of 2006/42/EC.

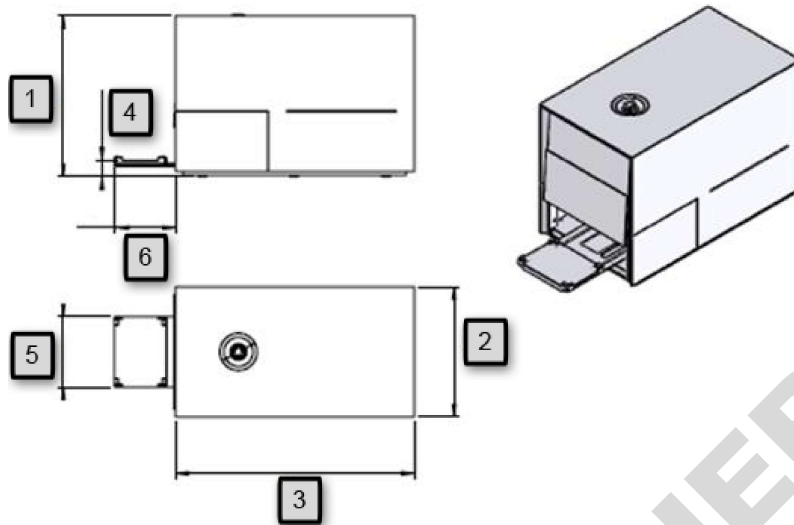


Figure 3-1: Machine Footprint

Table 3-2: Space Requirements

Reference Number	Parameter	Specification IntelliXcap 24	Specification IntelliXcap 48	Specification IntelliXcap 96
1.	System Height	386.2 mm	386.2 mm	320 mm
2.	System Width	256 mm	256 mm	256 mm
3.	System Depth	464.4 mm	464.4 mm	468 mm
4.	Stage Height	31.7 mm	31.7 mm	31.7 mm
5.	Stage Width	138 mm	138 mm	138 mm
6.	Stage Distance (when ejected)	136.5 mm	136.5 mm	136.5 mm
NA	System Weight	27(kg)	28(kg)	22(kg)

Environmental Requirements

The IntelliXcap shall be used within the rule set of the Good Laboratory Practices, GLP.

The machine must be operated indoors and under the following environmental specifications only:

Table 3-3: Environmental Requirements

Parameter	Specification
Temperature - Transport and Storage	15 to 40 °C (59 - 104 °F)
Temperature - Operation	0 to 40 °C (32 – 104 °F) Using the IntelliXcap in an environment where the temperature is 40 °C (104 °F) or higher for an extended period may cause the screen contrast level of the monochrome LCD to decrease from its original level of brightness.
Storage Humidity	10 to 70% RH Wet bulb temperature 39 °C (102 °F) max., no condensation
Relative Humidity	10 to 90% RH Wet bulb temperature 39 °C (102 °F) max., no condensation
Storage Lighting	All external surfaces are resistant to UV-light. Over time UV-light might affect LCD-panels: LCD screens may fade.
IP 30	Protection against small foreign bodies > 2.5 mm (e.g. a screwdriver), and no protection against water
Dust	0.1 mg/m ³ and below (non-conductive levels)
Pollution Degree	For use in Pollution Degree 2 environment Decontamination treatment with Hydrogen Peroxide Gas needs to be avoided as it will damage the electronic parts.

Electrical Requirements

The system must only operate with the power supply and frequency specified on the system identification stickers mounted on the side of the device. Operating the system with any other power supply or frequency can result in damage to the equipment.

Table 3-4: Electrical Requirements

Parameter	Specification
Supply Voltage	100-120 VAC 1/N/PE / 220-240 VAC 1/N/PE
	Use IEC 320 plugs only
	Ground must be connected at all times
Maximum Power Consumption	500W
Idle Power Consumption	100W
Supply Frequency	The machine operates below the noise emissions level: < 70 dB(A)
Fuses	Two fuses: 100-120V AV 5A fuse 220- 240 V AC 5A fuse
Insulation Resistance	Not less than 1MΩ at 1,000V
	Phase 1 = 50GΩ
	Neutral = 50GΩ
UI Connection	RS 232 cable

4. Installation

NOTICE

It is the responsibility of each person working on this product to know the applicable regulatory safety codes as well as the facility safety procedures, safety equipment, and contact information.



WARNING

Read the Safety Chapter

Failure to review the *Safety* chapter and follow the safety warnings can result in death or serious injury.

- All personnel involved with the operation or maintenance of this product must read and understand the information in this safety chapter.
- Follow all applicable safety codes of the facility as well as national and international safety codes.
- Know the facility safety procedures, safety equipment, and contact information.
- Read and understand each procedure before performing it.



The system is supplied fully assembled from the manufacturer and no further mechanical assembly is necessary.

Connect the IntelliXcap to a main power plug as required in "[Electrical Requirements](#)" on page 15 and insert the chosen cartridge before operation.

Unpacking

The instruction manual, the original copy of the Factory Acceptance Test (FAT) documentation (for the IntelliXcap and the cartridges), as well as power and communication cables are stored on the top of the IntelliXcap on the inner carton box.

Safety Requirements

When lifting the IntelliXcap, please use the cavity in its back and tilt the IntelliXcap to secure the bottom front of the instrument with your other hand.

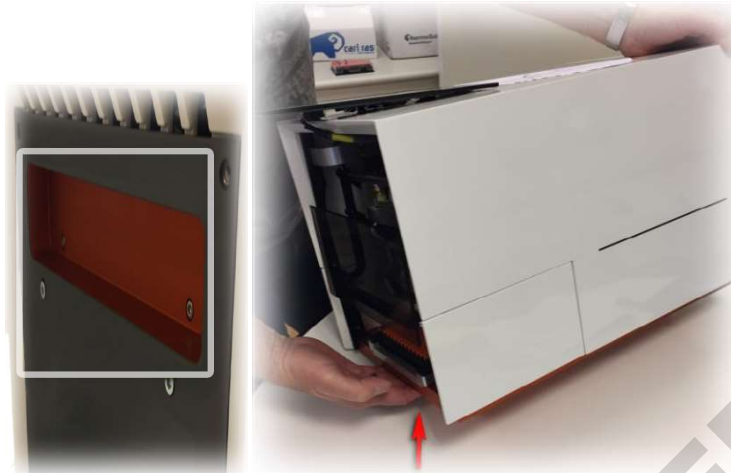






Figure 4-1: Lifting the IntelliXcap




Preparation

Step	Action
1.	Move the kit to the appropriate unpack area. Unpack the kit and inspect and confirm the contents. Report any missing or damaged items to Brooks Automation.
2.	Review this procedure and confirm that you have the proper items required to do the job.
3.	Review " Site Requirements " on page 12 for a full list of environmental, electrical, and space requirements.

Procedure

Step	Action
1.	Remove the lid from the wooden crate, and with two people remove the inner box. 

Step	Action
2.	<p>Open the cardboard box, the Manual and Factory Acceptance Test (FAT) are placed on the top of the inner box.</p> 
3.	<p>Remove the foam supports. The Power, USB and serial cables are located in the Outer cardboard box.</p> 
4.	<p>Remove the IntelliXcap the inner cardboard box using two people.</p> 

Step	Action
5.	<p>Open the inner box.</p>  A photograph showing a hand reaching into an open cardboard box. Inside the box, a large pink anti-static bag is visible, partially unwrapped from its white foam padding. The bag has some text and a logo on it.
6.	<p>With two people carefully lift the IntelliXcap system out of the inner Cardboard box, and place on a flat surface able to hold 28KG.</p>  A photograph of the IntelliXcap system, which is a rectangular device wrapped in a pink anti-static bag. The bag is placed on a dark, flat surface. The bag has some text and a logo on it.
7.	<p>Remove the anti-static bag.</p>  A photograph of the IntelliXcap system with the pink anti-static bag removed. The device is white and black, with a red button on top. It is placed on a dark, flat surface. The device has some text and a logo on it.

Step	Action
8.	<p>Remove the shipping tape securing both the door (seen above) and the stage seen to the left.</p> 
9.	<p>Keep the original packing material in a dry/low humidity location in case the IntelliXcap needs to be transported for service or repair. Follow all local regulations while disposing the original packing solution.</p>

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5. Operation

Overview



This chapter provides complete operation directions for the Brooks Automation IntelliXcap. The operation of the IntelliXcap is covered for both normal operating conditions and emergency conditions.

The IntelliXcap shall be screened off appropriately before operation and it must only be used to remove and replace screw caps on micro tubes in specific, SBS-footprint rack types.

The IntelliXcap has been designed and constructed to allow safe access to all areas where intervention could be necessary during operation.

The settings must not be changed.

Only trained individuals should monitor the IntelliXcap while in use.

 WARNING Read the Safety Chapter	
<p>Failure to review the <i>Safety</i> chapter and follow the safety warnings can result in death or serious injury.</p> <ul style="list-style-type: none">• All personnel involved with the operation or maintenance of this product must read and understand the information in this safety chapter.• Follow all applicable safety codes of the facility as well as national and international safety codes.• Know the facility safety procedures, safety equipment, and contact information.• Read and understand each procedure before performing it.	

Theory of Operation

Basic Process

Step	Action
1.	The operator places a rack fully or partially filled with capped tubes onto the instrument's stage.
2.	The IntelliXcap confirms that the consumables match the expected height and then de-caps or caps all the tubes.
3.	If the instrument detects that the tube rack is of a height different to that expected, it returns an error-message.



NOTE: The time for required to de-cap or re-cap varies from 20 - 40 seconds.

LED Indicators

Table 5-1: LED Indicators and Definitions



LED Color	Definition
Green	Operation ready. Main menu is displayed.
Green Flashing	Operation in progress.
Orange	Standby status. Press button to leave standby. Message appears on the screen
Red	Error code is displayed on screen.

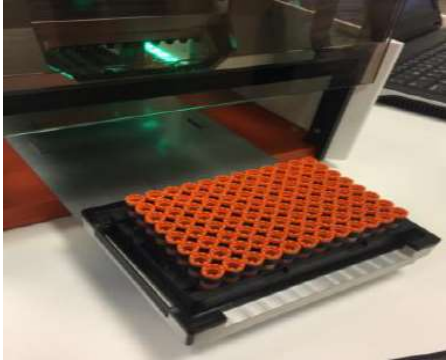

Starting the IntelliXcap

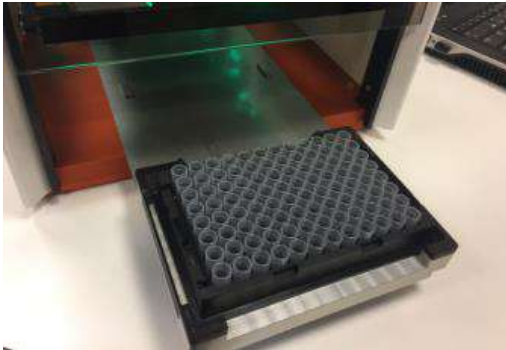
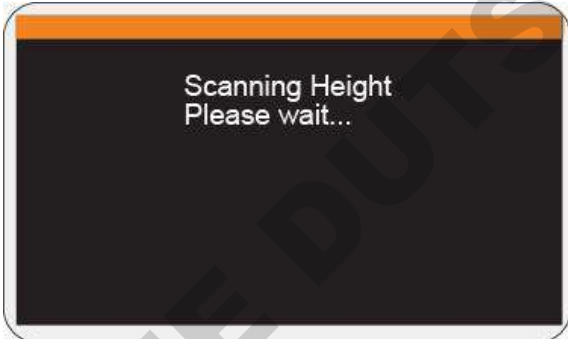

 CAUTION Inappropriate Use	
<p>Use of this product in a manner or for purposes other than for what it is intended may cause equipment damage or personal injury.</p> <ul style="list-style-type: none"> • Only use the product for its intended application. • Do not modify this product beyond its original design. • Always operate this product with the covers in place. • Do not change settings. 	

NOTICE

It is the responsibility of each person working on this product to know the applicable regulatory safety codes as well as the facility safety procedures, safety equipment, and contact information.

Step	Action
1.	Connect the power-cable to the instrument from the back and to the electrical power socket 100/240VAC.
2.	Ensure that the door is free from obstructions, and that there is nothing in front of the instrument. Turn the IntelliXcap on, using the switch at the rear of the system.
3.	The IntelliXcap will start up and begin the Initialization-process. During this process the door will open, and the stage move into its extended position. 
4.	The IntelliXcap initializes and displays the Start option. 

Step	Action
5.	<p>Place the correct rack for the cap-driver cartridge being used into the stage and press the start button on the display.</p> <p>Choose the Start button. The instrument confirms the height of the tubes and then starts de-capping.</p> 
6.	<p>When in use, the IntelliXcap displays the current process with a large STOP button display indicating the unit is in use.</p> <p>In case of need, you have the option to stop the current process by clicking the button on screen or by pressing the E-Stop button located at the top of the unit.</p> 

Step	Action
7.	<p>Once the de-capping process has finished, the IntelliXcap is ready to start the re-capping process.</p> <p>When ready, place the rack of uncapped tubes and press start.</p> 
8.	<p>The instrument scans and detects the correct height of the tubes and begins the recapping process.</p> 
9.	<p>Once the cartridge has reached the correct height, the IntelliXcap proceeds automatically and starts recapping the sample-tubes</p> <p>In case of need, you have the option to stop the current process by clicking the button on screen or by pressing the E-Stop button located at the top of the unit.</p> 

6. Preventative Maintenance



Overview



This chapter provides complete maintenance schedules and procedures for the Brooks Automation IntelliXcap.

Preventative Maintenance

This section provides the schedule and procedures for routine preventative maintenance (PM) of the IntelliXcap to reduce unscheduled downtime. The IntelliXcap is designed to require very little routine maintenance. However, it is recommended that the preventative maintenance procedures and schedule provided in this section be followed to extend the operating life of the IntelliXcap. If additional procedures are required, they will be supplied along with their maintenance schedules by Brooks Automation.

All preventative maintenance procedures and schedules provided here assume that the IntelliXcap is operating in a clean, dry, inert environment. Any deviation from this basic environment will affect the scheduling of PM and may also require additional PM procedures be performed. The user should adjust the preventative maintenance schedule as appropriate to account for any deviations from this environment.

 WARNING Read the Safety Chapter	
<p>Failure to review the <i>Safety</i> chapter and follow the safety warnings can result in death or serious injury.</p> <ul style="list-style-type: none">• All personnel involved with the operation or maintenance of this product must read and understand the information in this safety chapter.• Follow all applicable safety codes of the facility as well as national and international safety codes.• Know the facility safety procedures, safety equipment, and contact information.• Read and understand each procedure before performing it.	

 CAUTION Unauthorized Service	
<p>Personal injury or damage to equipment may result if this product is operated or serviced by unauthorized personnel.</p> <ul style="list-style-type: none"> • Only qualified personnel are allowed to transport, assemble, operate, or maintain the Product. • Properly qualified personnel are those who have received certified training and have the proper qualifications for their jobs. 	

Parts

Brooks Automation can provide all parts required for preventive maintenance. For a list of these parts, contact Brooks Automation Technical Support. To obtain additional information about parts for preventative maintenance, contact your local Brooks Sales Representative, or call Brooks Automation Technical Support. See "[Technical Support](#)" on page 1.

Schedules and Procedures

The service life of the IntelliXcap is 20 years of a daily 8-hour operation. This is based on the presumption that all service and maintenance instructions described in this instruction manual are observed.

Maintenance Schedule

Servicing the machine must only be carried out by qualified personnel. Tasks may require skills and training. These instructions are a minimum requirement and must be carried out according to the plan below.

Keep a logbook, or similar, to document the maintenance and cleaning schedules.

Table 6-1: Preventative Maintenance Schedule


Task	Recommended Service Interval	
	Cap-Driver Cartridge	IntelliXcap
General Visual Inspection	2,500 cycles	NA
Preventative Maintenance Visit	NA	20,000 cycles or 12 months which ever comes sooner
Exchange	5,000 cycles	At 40,000 cycles it is recommended that the Head is replaced

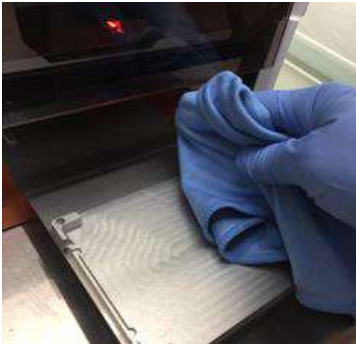
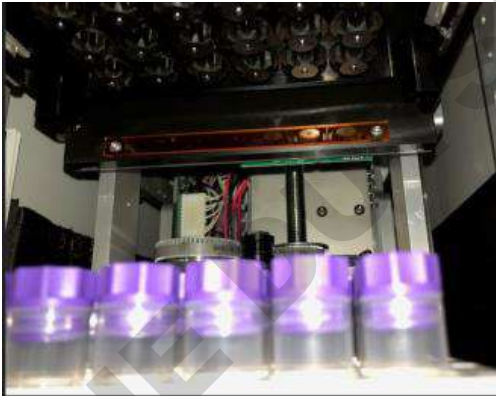
Cleaning

For cleaning tasks, follow safe work practices. This includes the use of personal protective equipment, that machinery and components are put in a safe condition before the task is initiated, and that the manufacturer instructions are complied with.

- Before the task is initiated, ensure that the power supply to the machine is safely disconnected.
- Obtain permission from the person responsible for the IntelliXcap before performing any repair work.
- Shield and/or keep the work area in a moist condition to prevent dust from flying around or smoldering.
- The operator, or specially trained cleaning staff, should tidy up and clean the IntelliXcap and its surroundings daily. During this work, the same requirements for the use of tools and personal protective equipment apply as for the operational work.
- Read and understand this instruction manual before the maintenance and cleaning of the machine is initiated.
- The machine requires no user maintenance other than cleaning with any 70% alcohol solution.
- Keep a logbook, or similar, to document the maintenance and cleaning schedules. If regular maintenance and cleaning of the machine cannot be shown, the manufacturer's warranty may lapse.
- Maintenance and cleaning must comply with 1.6 of Annex I of 2006/42/EC.

Table 6-2: Cleaning

Step	Action
1.	<p>Switch off the IntelliXcap to remove any risk of personal injury. Wipe IntelliXcap externally with a microfiber or lint free cloth.</p> 

Step	Action
2.	<p>Wipe the machine drawer for plastic dust debris from the cap driver / tubes. A new cartridge can produce minor plastic dust when first used.</p> 
3.	<p>Wipe the Light curtain, front and back (image shows rear screen as seen through the front of system): It is important that the orange filter on the light source is always free of dust, so it can always effectively identify the rack and cap carriage.</p> 
4.	<p>If necessary, use isopropyl alcohol to disinfect and further clean surfaces</p>

Inspect Cartridge

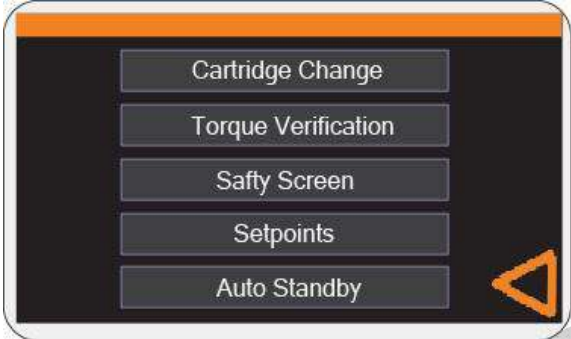
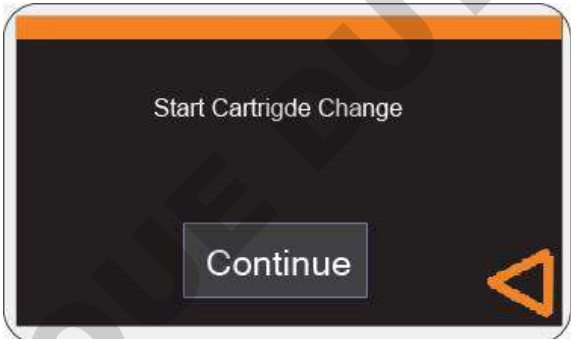
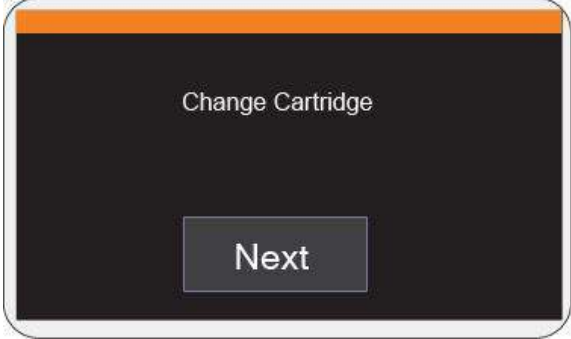
The cartridges used on the IntelliXcap have a limited life, generally expected to be in the region of 5000 cycles.

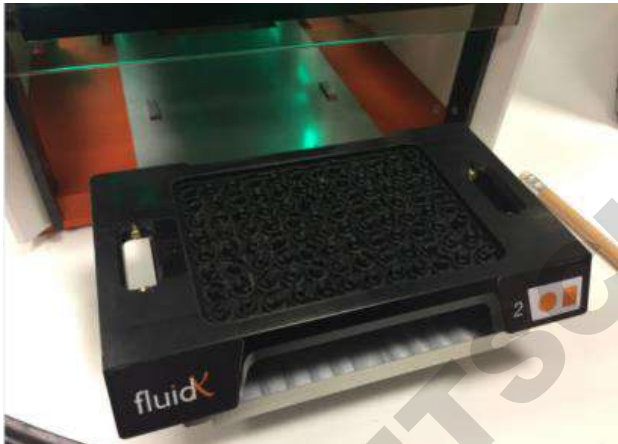

After every 2500 cycles with a cartridge, the IntelliXcap will give a service counter warning. Remove the cartridge and visually look for signs of damage / excessive wear and tear. If damage is seen it will be necessary to replace the cartridge.

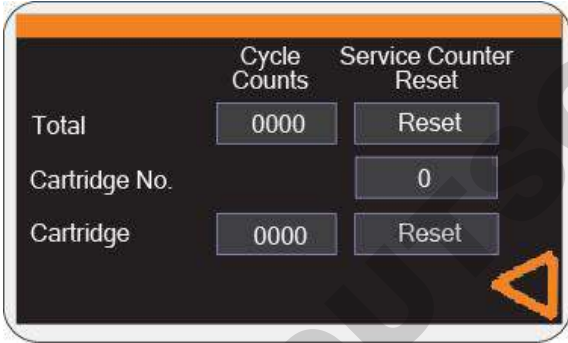
In addition, it is recommended to gently wipe the cartridge over with a lint free cloth and a little isopropyl alcohol to remove any dust that might have accumulated.

Change Cartridge

If a cartridge must be replaced, use the following procedure.

Step	Action
1.	<p>Go to the Set-Up Menu and select Cartridge Change.</p>  <p>The screenshot shows a dark screen with an orange header bar. Five menu items are listed vertically: 'Cartridge Change', 'Torque Verification', 'Safety Screen', 'Setpoints', and 'Auto Standby'. A yellow triangle icon is in the bottom right corner.</p>
2.	<p>Press Continue.</p> <p>The stage moves inside the unit and the cap-driver cartridge is lowered and placed onto the stage.</p>  <p>The screenshot shows a dark screen with an orange header bar. The text 'Start Cartridge Change' is centered. A 'Continue' button is at the bottom center. A yellow triangle icon is in the bottom right corner.</p>
3.	<p>Press Next.</p> <p>The stage returns to the home position.</p>  <p>The screenshot shows a dark screen with an orange header bar. The text 'Change Cartridge' is centered. A 'Next' button is at the bottom center. A yellow triangle icon is in the bottom right corner.</p>

Step	Action
4.	<p>When the homing process is complete, exchange the cap-driver cartridge with another one.</p> <p>NOTE: Verify the new cartridge fits the alignment inserts on the sides of the stage's frame.</p> <p>The stage with the cartridge moves inside the unit and the cap-driver cartridge is collected and attached to the de-capping head.</p> <p>The head will carry out a re-initialization process which needs to be completed before the first de-capping process can be carried out.</p> 
5.	<p>There is an automated counter feature, which can be accessed from the main menu.</p> 



Step	Action
6.	<p>Total – Cycle Counts tells you the total cycles performed by the instrument during its lifetime.</p> <p>Every 20,000 cycles a Machine time for service warning is issued to prompt the user to arrange a service visit. The Service Counter will be reset as part of the service visit.</p> <p>Note: When a maintenance warning pops up, the instrument does not stop functioning: it is only a notice for you to schedule routine service. The number of cycles remaining until the next warning displays is not shown.</p> <p>The system will also count the cycles for each cartridge type. If the user operates the IntelliXcap with two different kinds of cartridges, it counts and records the cycles separately for each type.</p> <p>The Cartridge warning can be removed by pressing the Reset button.</p> <p>Over time, the cartridges will need replacement, (recommended after every 5000 cycles).</p> 

Waste Disposal

Switchboards, motors, cables and other electronics must be demounted and treated separately according to local law.

Metal parts are disposed of as scrap metal.

7. Troubleshooting

 CAUTION Unauthorized Service	
<p>Personal injury or damage to equipment may result if this product is operated or serviced by unauthorized personnel.</p> <ul style="list-style-type: none"> • Only qualified personnel are allowed to transport, assemble, operate, or maintain the Product. • Properly qualified personnel are those who have received certified training and have the proper qualifications for their jobs. 	

Error Messages

Error Code	Cause	Corrective Action
E100	Main Z operation timeout in homing operation.	Call service.
E101	Stage/nest timeout in homing sequence in homing command.	Call service.
E102	Main Z operation timeout in homing command.	Call service.
E103	Main Z operation timeout in homing command.	Call service.
E104	Opening safety door operation timeout in homing command.	Check the door has not been blocked, or damaged. Call service.
E105	Cartridge operation timeout in homing command.	Call service.
E106	Cartridge operation timeout in homing command.	Call service.
E107	Cartridge operation timeout in homing command.	Call service.

Error Code	Cause	Corrective Action
E108	Cartridge operation timeout in homing command.	Call service.
E109	Stage operation timeout.	Call service.
E110	Stage operation timeout.	Call service.
E111	Stage operation timeout.	Call service.
E112	Closing safety door operation timeout in decap command.	Check the door has not been blocked, or damaged. Call service.
E113	No tube/rack combination found in decap command.	Verify the stage is not empty. Call service.
E114	Tube/rack combination does not match any profile comparison in decap command.	See "Error Recovery" on page 40 . Ensure caps are properly screwed onto tubes. Ensure tubes are seated properly in rack. Ensure rack is properly seated in stage. Verify selected tube/rack combination with cartridge setup profile document. Call service.
E115	Opening safety door operation timeout in decap command.	Check the door has not been blocked, or damaged. Call service.
E116	Closing safety door operation timeout in recap command.	Check the door has not been blocked, or damaged. Call service.
E117	No tube/rack combination found in recap command.	Verify the stage is not empty. Call service.
E118	Tube/rack combination does not match any profile comparison in re-cap command.	See "Error Recovery" on page 40 . Ensure tubes are seated properly in rack. Ensure rack is properly seated in stage. Verify selected tube/rack combination with cartridge setup profile document. Call service.

Error Code	Cause	Corrective Action
E119	Opening safety door operation timeout in Close Tray operation.	Check the door has not been blocked, or damaged. Call service.
E120	Opening safety door operation timeout in recovery mode.	Check the door has not been blocked, or damaged. Call service.
E121	Closing safety door operation timeout in cartridge eject command.	Check the door has not been blocked, or damaged. Call service.
E122	Timeout ejecting cartridge in cartridge eject sequence.	Call service.
E123	Opening safety door operation timeout in cartridge eject command.	Check the door has not been blocked, or damaged. Call service.
E124	Opening safety door operation timeout in cartridge load operation.	Check the door has not been blocked, or damaged. Call service.
E125	Main Z sequence timeout in Store command.	Call service.
E133	Main Z timeout in Head Up command.	Call service.
E134	Opening safety door operation timeout in recovery mode.	Check the door has not been blocked, or damaged. Call service.
E135	Decap command did not succeed within allowed automatic retries.	See "Error Recovery" on page 40. Replace any loose or partial unscrewed caps. Retry with a new decap. Retry with a new rack. Call service.
E136	Recap command did not succeed within allowed automatic retries.	See "Error Recovery" on page 40. Replace any loose or partial unscrewed caps. Retry with a new decap. Retry with a new rack. Call service.

Error Code	Cause	Corrective Action
E137	Cartridge has reached lower operational limit.	Power cycle instrument. Call service.
E138	Timeout opening stage/nest in Open Tray operation.	Call service.
E139	Cartridge eject initialized, no cartridge detected at startup.	Run cartridge load command. Call service.
E140	Safety door has been forced out of open position.	Verify there is no objects blocking the safety door. Run a decap / recap cycle. Call service.
E141	Safety door has been forced out of close position.	Verify there is no objects blocking the safety door. Power cycle the unit. Run a decap / recap cycle. Call service.
E142	Object detected in cartridge eject sequence.	Remove any objects on the stage. Call service.
E143	Object not detected in cartridge load sequence.	Ensure cartridge is placed on the stage. Call service.
E144	Cartridge height detect wrong during cartridge load	Ensure you have the right cartridge for the right instrument. Call service.
E145	Lightcurtain calibration fault in decap sequence.	Remove any direct light sources. Call service.
E146	Lightcurtain calibration fault in recap sequence.	Remove any direct light sources. Call service.
E147	Lightcurtain calibration fault in cartridge eject sequence.	Remove any direct light sources. Call service.
E148	Lightcurtain calibration fault in cartridge load sequence.	Remove any direct light sources. Call service.

Error Code	Cause	Corrective Action
E149	Timeout Open Tray operation in recovery mode.	Call service.
E150	Timeout homing cartridge sequence in Store command.	Power cycle instrument. Call service.
E151	Timeout Close Tray operation in recovery mode.	Call service.
E152	Decap Error detected in decap retry operation.	See "Error Recovery" on page 40. Remove any partial screwed on caps. Initialize the instrument. Retry the operation. Call service.
E153	Closing tray sequence timeout in recovery mode close tray operation.	Call service.
E154	Timeout Close Tray sequence in close tray operation.	Call service.
E155	Timeout opening stage sequence in Open Tray operation.	Call service.
E156	Main Z operation timeout in init with caps operation.	Call service.
E157	Timeout stage sequence in Init with caps operation.	Call service.
E158	Timeout in cartridge homing sequence in recap operation.	Call service.
E159	Timeout in stage homing sequence in recap operation.	Call service.
E160	Timeout opening safety door sequence in Standby operation.	Verify there are no objects blocking the safety door. Power cycle the unit. Run a Standby operation. Call service.
E161	Main Z operation timeout in init with caps operation.	Call service.
E162	Timeout stage/nest sequence in recovery mode.	Call service.

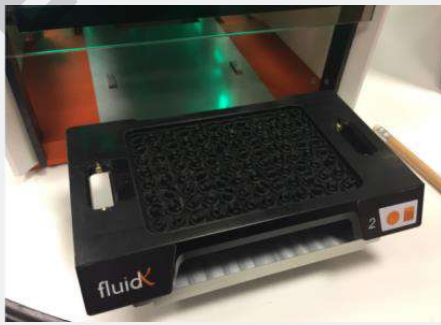
Error Code	Cause	Corrective Action
E163	Caps on Pins detected, RECOVERY MODE activated.	See "Error Recovery" on page 40. Use "EJECT CAPS" operation to push caps off machine. Use "INITIALIZE" to restart the instrument.
E164	Timeout stage sequence in decap operation.	Call service
E165	Timeout opening safety door during manual retry decap operation.	Check the door has not been bent out of shape and remove any object that is blocking operation. Call service.
E166	Timeout homing stage sequence in manual retry decap operation.	Call service.
E167	Timeout positioning stage sequence in manual retry decap operation.	Call service.
E238	Emergency stop is active.	Twist release emergency stop. Power cycle unit. Call service.

Technical Support

For technical support in connection with your IntelliXcap, please contact a technical representative at: BLSS.Service@brooks.com

Location	GUTS® Contact Number	Website
North America	+1-800-FOR-GUTS (1-800-367-4887) +1-978-262-2900	http://www.brooks.com/
Europe	+49-1804-CALL-GUTS (+49-1804-2255-4887)	http://www.brooks.com/
Japan	+81-45-477-5980	http://jp.brooks.com/
China	+86-21-5131-7066	http://cn.brooks.com/
Taiwan	+886-3-5525225	http://tw.brooks.com/
Korea	+82-31-288-2500	http://kr.brooks.com/
Singapore	+65-6464-1481	http://www.brooks.com/

Please include the following information to the representative at time of issue:

Information	Location/Instructions
Product Part Number and Serial Number	Can be found on a sticker on the rear of instrument.
Cycle Count for instrument and cartridge	See "LED Indicators" on page 22.
Cartridge type	Can be seen on the front right hand side of the cartridge 
Any error messages	Error code shown at top of start screen (Check Appendix 2 for ways to resolve errors).
Is the unit part of an integrated system?	
Firmware version	Information shown on the screen during initialization, and can be found from the main screen "info" > "SW version"

Error Recovery

Table 7-1: Typical Errors

Error	Symptom	Resolution
CAP ERROR	Tube is not de-capped properly, the IntelliXcap will automatically make a second attempt. If the IntelliXcap fails on the second attempt, an error message is shown on the screen, and the IntelliXcap stops.	Manually add a new cap to the tubes and perform a new de-capping cycle.
RECAP ERROR (Error Code: 136)	Cap is improperly placed onto the corresponding tubes during the recapping process.	Select the Initialization (Restart) button and start the IntelliXcap.

Manual Recovery



In any error situation, you have the option to cancel the process. You will be prompted to start a manual recovery process. Choose the most relevant case available on the screen.

Use the up and down arrows to access additional options.

Step	Action
1.	Use the Access door Up-option to lift the access door;
2.	Try to move the Screwing Head Up;
3.	If there are still caps attached to the ejecting pins, use a bowl to collect the falling caps and then choose Eject Caps from the menu;
4.	Once the caps have been ejected and collected, use the option Open Tray.

Appendix A. Integrating the IntelliXcap

The IntelliXcap can be integrated into an automated environment as well as robotic systems. A serial communication set RS 232 can fully control the entire system and eliminates the use of the touch-screen while operating. Commands for the IntelliXcap vary depending on the version of Firmware being used – to obtain the relevant command set, or for additional support please contact Brooks technical support at BLSS.Service@brooks.com with the details outlined in "Technical Support" on page 39.

Additionally, it is possible to run the IntelliXcap units in a legacy mode, emulating the commands used on the older XSD96,48 and 24 units – for support with configuration and commands please contact Brooks support as described above.

Appendix B. Available Cartridges

The IntelliXcap can work with a range of tube types - a specific cartridge is required for each different cap design. See below for a list of available cartridges.

Additional cartridges are released occasionally. To check the current list or to request a cartridge for your specific storage tube, please contact your local sales representative or contact "[Technical Support](#)" on page 39.

Table 7-2: IntelliXcap 96

Part Number	IntelliCartridges for IntelliXcap 96 Description – (single cartridge)
48-8013-01	96 format cap driver cartridge with 96 individual cap drivers for FluidX Internal Next-Gen Thread
48-8013-02	96 format cap driver cartridge with 96 individual cap drivers for FluidX External Thread
48-8013-03	96 format cap driver cartridge with 96 individual cap drivers for FluidX Internal o-Ring Thread
48-8013-04	96 format cap driver cartridge with 96 individual cap drivers for FluidX Acoustic Tube Thread
48-8013-05	96 format cap driver cartridge with 96 individual cap drivers for Thermo Nunc Cryobank & Matrix 200ul Low Profile Internal Thread
48-8013-07	96 format cap driver cartridge with 96 individual cap drivers for Micronic Internal Thread. NOT compatible with Micronic low profile caps.
48-8013-08	96 format cap driver cartridge with 96 individual cap drivers for Micronic External Thread
48-8013-09	96 format cap driver cartridge with 96 individual cap drivers for LVL Technologies Internal Thread
48-8013-10	96 format cap driver cartridge with 96 individual cap drivers for LVL Technologies External Thread
48-8013-11	96 format cap driver cartridge with 96 individual cap drivers for Thermo Matrix Internal Thread
48-8013-12	96 format cap driver cartridge with 96 individual cap drivers for FluidX 0.2ml Tube Thread
48-8013-13	96 format cap driver cartridge with 96 individual cap drivers for Greiner Cryo.s Biobanking Internal Thread

Table 7-3: IntelliXcap 48

Part Number	IntelliCartridges for IntelliXcap 48 Description – (single cartridge)
48-8015-01	48 format cap driver cartridge with 48 individual cap drivers for FluidX 1.5ml, 1.9ml, 4.0ml Next-Gen Jacket & 2.0ml Jacket Auto-friendly External Thread
48-8015-03	48 format cap driver cartridge with 48 individual cap drivers for FluidX Non-Jacket 2.0ml / Greiner 2.0ml External

Table 7-4: IntelliXcap 24

Part Number	IntelliCartridges for IntelliXcap 24 Description – (single cartridge)
48-8017-01	24 format cap driver cartridge with 24 individual cap drivers for FluidX 6ml Jacket & 10ml Next-Gen Jacket Auto-friendly External Thread
48-8017-03	24 format cap driver cartridge with 24 individual cap drivers for Micronic 6ml Internal Thread