

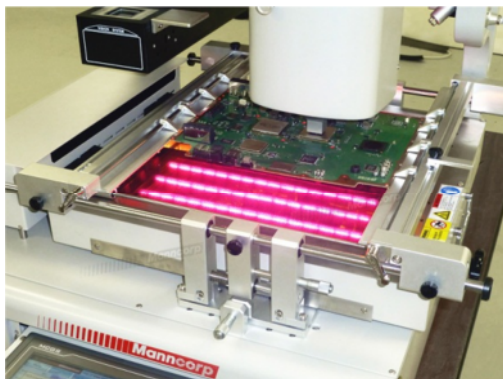
# BR790-HD SMT / BGA Rework Station



## Quick Overview

### High-Definition, Auto-X-Y Split-Vision Alignment for Automatic Removal, Placement, and Soldering of BGAs, CSPs, QFPs, and Other SMDs

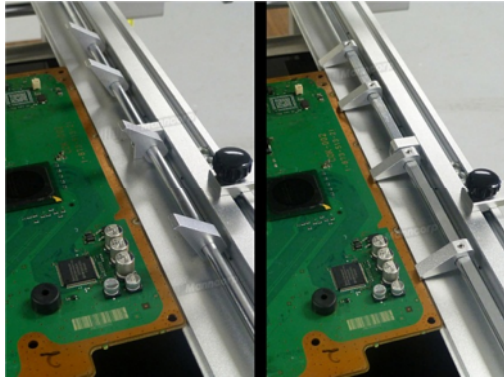
Split-vision optics with a 1.3 million pixel, high-definition video camera and five separate thermocouple inputs make the Manncorp BR790-HD the ultimate solution for safe, repeatable removal, alignment, placement, and soldering of BGAs, CSPs, ultra-fine-pitch QFPs and other delicate, heat-sensitive, and expensive SMDs. Motorized X- and Y-axis control of the split-vision optics, ultra-sensitive Z-axis height-sensing controlled by optoelectronic switching, and a 6-zone rapid-IR underheater also contribute to performance that makes the BR790-HD the most advanced rework system Manncorp has ever offered.



### Easily Adjustable PCB Holder Accepts Boards Up To 550 mm x 500 mm

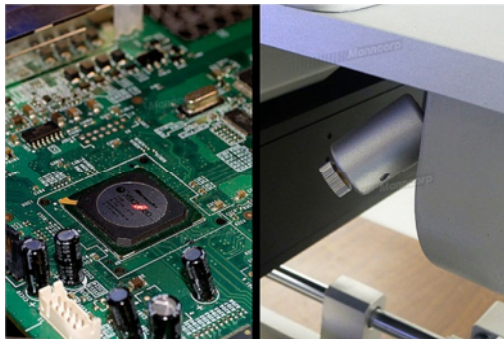
The BR790-HD's unique board holding system accommodates virtually any surface mount or mixed technology PCB assembly up to 550 mm x 500 mm (21.6" x 19.7"). A wide range of X- and Y-axis adjustability, universal PCB support rails, and a moveable 6-zone, high-efficiency,

rapid IR underheater ensure that any application set-up can be optimized to take full advantage of all the BR790-HD's advanced features.



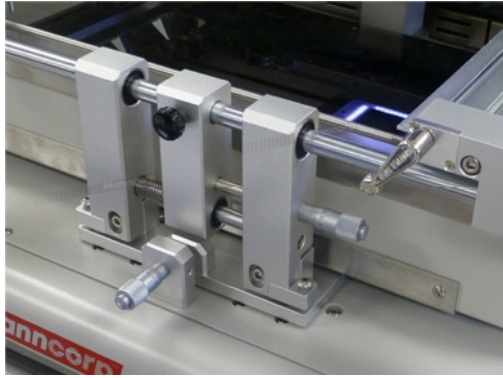
### **Unique PCB Clamping and Support System Adjusts in Seconds**

Unlike most PCB holders with adjustable edge rails, boards placed onto the BR790-HD support rails are locked in place by a series of independently adjustable clamps that can be positioned at any desired location along the rail. With the flip of a lever, the clamps lower from their raised position (shown at left) to the locked position (shown at right). With the board held securely, the rework site can easily be positioned between the top and bottom heaters, and the bottom heater raised to the PCB, without any danger of the PCB falling off the rails.



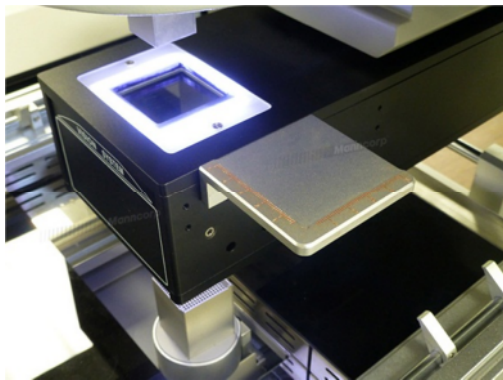
### **Innovative Laser Guide for Easy Alignment of Component Over Bottom Side Heater**

Proper setup of the BR790-HD calls for alignment of the bottom heater, the component, and the top heater in the Z axis. Positioning the board in the PCB holder so that the component on the top side is positioned directly over the bottom heater nozzle is facilitated with a handy laser pointer that is mounted to the base structure and is targeted at the virtual center of the bottom heater. Positioning the component on the PCB below the laser spot ensures that the bottom heater, component, and upper heater are virtually aligned and reduces setup time.



### **X, Y, and Theta Axes Micrometers for Alignment of Component Leads to PCB Pads**

Ultra-fine micrometers on the PCB holder for X- and Y- axes, and an additional one on the pick-up head for the theta axis, allow fast, easy, and precise alignment of the component leads to the PCB pads. Alignment is performed with the aid of ultra-high-resolution images of the board and the component, superimposed by the High-Definition Split-Vision Optics and projected onto the large 15" LCD display.



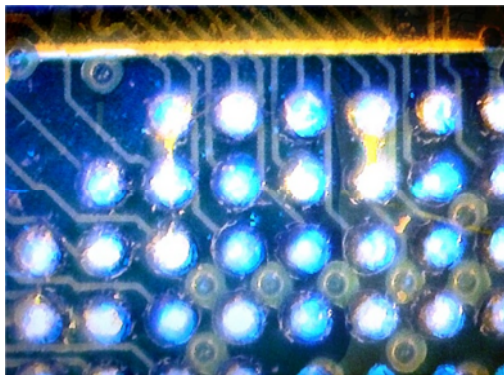
### **Auto-Pickup of SMDs from the Component Presentation Nest Protects**

In preparation for alignment and soldering, new or re-balled SMDs are gently placed in the corner of the Component Presentation Nest which is attached to the Split-Vision Optics. When the alignment function is initiated, the Split-Vision Optics' X-Y drive motors automatically position the component directly under the pickup head and soldering nozzle. The pickup head and soldering nozzle are then automatically lowered and the component is picked up. With the component suspended on the vacuum nozzle, the Split-Vision Optics are then automatically positioned between the component and the PCB so that the bottom of the component and the pads on the PCB are simultaneously displayed on the BR790-HD's full color 15" LCD display. These features protect components from damage due to mishandling and dramatically reduce cycle times by eliminating the need for operators to position the Split-Vision Optics.



### **High-Definition (1.3 Million Pixels) Split-Vision Optics for Precise Alignment**

High Definition Split-Vision Optics, with electronic zoom and focus, and high-brightness adjustable LED lighting provide high-contrast superimposed images of the component leads (as it is being held on the placement head) and the pads on the PCB. The operator views this image on the BR790-HD's full color 15" LCD display and if the component leads are misaligned with the pads on the PCB (as shown at left)...



...the X-, Y-, and Theta axes micrometer adjustments can then be used to align the component and board (as shown at left). Once the component leads and pads are aligned, precise placement is ensured.

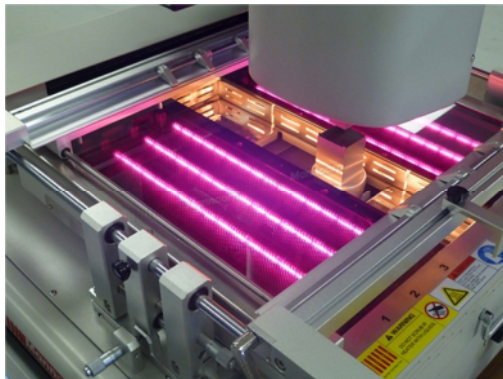


### **Touch Screen Control and Five Thermocouple Inputs for Precise Profiling**

Programming and setup of the BR790-HD are performed through the use of a convenient LCD touch screen controller and touch pen that, when not being used, slide into the system's base for

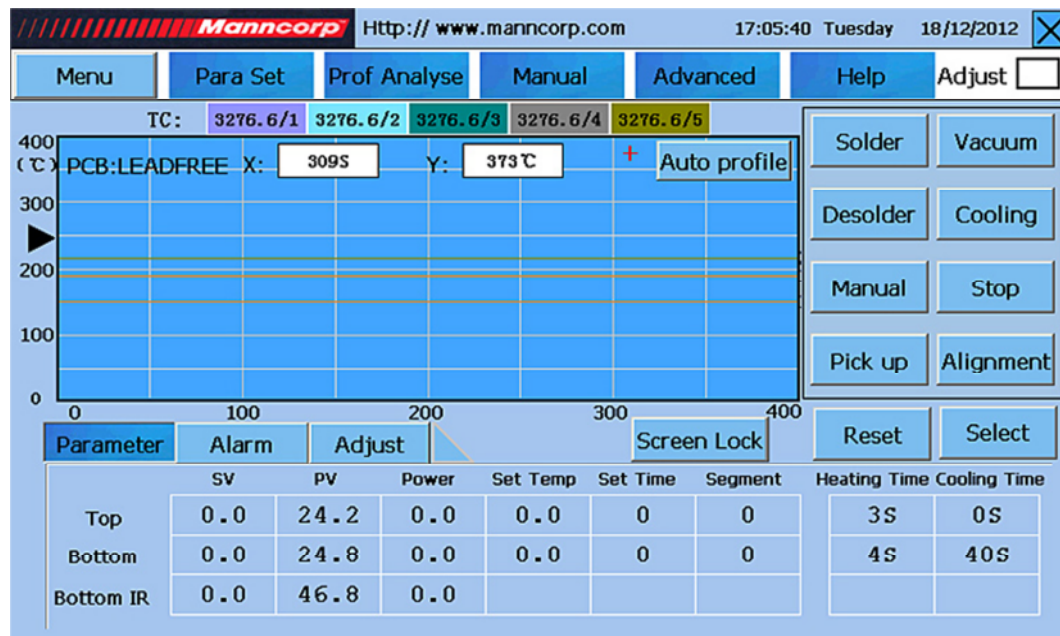


safe storage. Five separate thermocouple inputs allow real-time monitoring of actual temperatures at a variety of critical locations on the PCB and components. Screen captures of actual process profiles can then be saved to a separate memory device connected to the built-in USB port on the side of the controller. Separate controls for the split-vision optics upper and lower high-brightness LED lighting provide maximum clarity and contrast between the superimposed images of the component leads and PCB pads on the BR790-HD's full color 15" LCD display.



### Large 6-Zone Rapid IR Underheater Prevents Thermal Stress & Improves Efficiency

The BR790-HD's large PCB capacity is complemented by a 6-zone "Rapid IR" underheater with a generous 470 mm x 350 mm heating area to evenly and efficiently heat the bottom of the board. Not only does "Rapid IR" prevent board warpage and stress on components and solder joints adjacent to the rework site; it also reduces overall cycle times and maximum temperature exposure. Programmable power settings are capable of supplying up to 3600 watts of power and, for energy savings, separate control switches allow activation or deactivation of zones relative to PCB size. Tinted glass shields over the heating elements dissipate heat rapidly and isolate the heater compartment.



### One-Touch Rework Functions and Parameter Adjustment On-the-Fly

The BR790-HD user interface features password protected user privileges that separate operator and administrative/programming functions. Operator controls allow one-touch functionality for desoldering operations with automatic placement and soldering also taking place at the touch of a button. When creating profiles, the ability to edit parameters from the same screen where the real-time temperature profile is displayed provides almost instantaneous feedback and reduces setup time.

The screenshot displays the Manncorp user interface for the BR790-HD. The top status bar shows the website URL, date, and time. Below this is a navigation menu with buttons for Menu, Para Set, Prof Analyse, Manual, Advanced, Help, and Adjust. The main display area is titled 'PCB LEADFREE' and shows 'BGA Length' as 38 and 'BGA Width' as 38. A large table contains parameters for 'Top' and 'Bottom' heaters, each with 8 segments. To the right of the table are input fields for 'Preheat Temperature', 'Temperature Offset', 'Preheat Power', 'Cooling Time', 'Bottom IR Temperature', and 'Overheat Alarm'. At the bottom, there are checkboxes for 'Pb' (Lead) and a 'Select' button, along with a 'Pb' checkbox that is currently unchecked and a checkmark button.

Top	1	2	3	4	5	6	7	8
Rate	200.0	200.0	200.0	200.0	200.0	0.0	0.0	0.0
Target Temp	55.0	185.0	165.0	230.0	180.0	0.0	0.0	0.0
Dwell Time	45	70	45	70	10	0	0	0

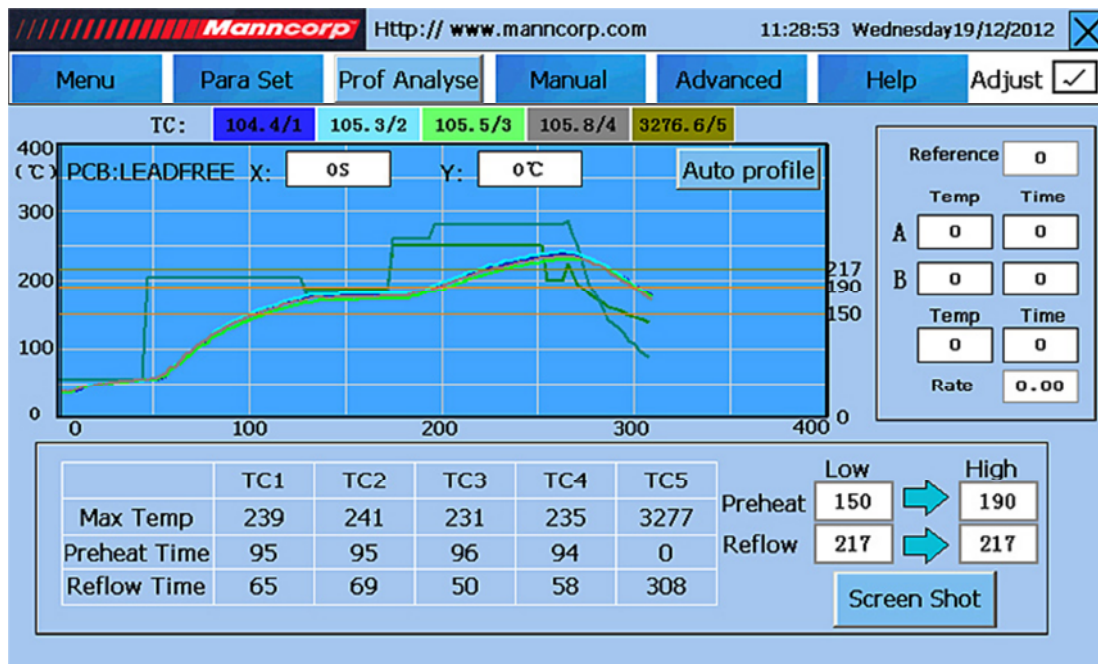
Bottom	1	2	3	4	5	6	7	8
Rate	200.0	200.0	200.0	200.0	200.0	0.0	0.0	0.0
Target Temp	55.0	185.0	165.0	240.0	260.0	0.0	0.0	0.0
Dwell Time	45	70	45	20	70	0	0	0

Preheat Temperature: 0  
Temperature Offset: 0  
Preheat Power: 0  
Cooling Time: 40  
Bottom IR Temperature: 250  
Overheat Alarm: 5

Pb ☐ Select ☒ Pb ☐

### Programmable Heating Rate, Target Temperature, and Dwell Time

Sets of profile parameters for both leaded and lead-free solders can be divided into as many as eight individual segments for both the top and bottom heaters, each with its own heating rate, target temperature, and dwell time at the targeted temperature. Temperature and power settings for the IR underheater and the duration of the cooling fan operation are also saved as part of the parameter set.



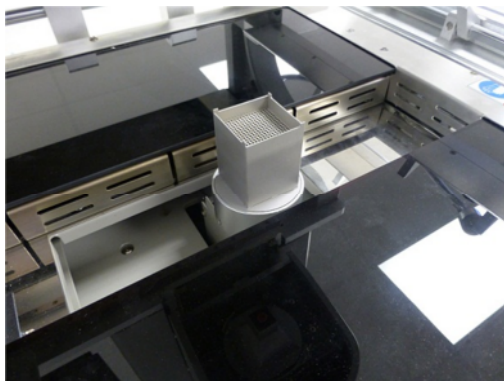
### Real-Time Data Recording and Profile Analysis

The five separate thermocouple inputs allow real-time monitoring of temperatures at the desired locations on the component or PCB. Collected data can be analyzed to ensure consistency with solder and/or component manufacturer's recommendations and can also be captured in bitmap format and written to a memory device connected to the BR790-HD's standard USB port.



### Full Set of Vacuum Nozzles Included for Automatic Pick-Up and Placement of SMDs

The BR790-HD comes with a complete set of vacuum nozzles to handle components from 3 mm x 3 mm up to 80 mm x 80 mm and a maximum weight of 70 grams. High temperature silicone vacuum tips and adapter sleeves attach to the standard vacuum nozzles to increase contact area and pick-up force.



### **Bottom Heater Nozzles Included To Handle Most All BGA and CSP Applications**

The BR790-HD is also shipped with 36 mm x 36 mm and 58 mm x 58 mm bottom heater nozzles to accommodate 95% of all rework applications involving removal and resoldering of BGAs, CSPs, and other devices that require bottom heating. Bottom heater nozzles can also be supplied in custom sizes for applications that require confinement of heat to a smaller area.



### **Wide Variety of Upper Heater Nozzles To Solder or Desolder Virtually Any SMD**

Nozzles for the upper heater are ordered based on the user's needs and are available in virtually any size to direct heat to the top surface and perimeter leads of a surface mounted device. A full listing of standard nozzles and pricing is available in the BR790-HD Options/Accessories area, and custom sizes are also available upon special request. Upper Heater Nozzles are held in place in a magnetic collar that allows quick, “tool-less” changeover in just a few seconds.

### ***BR790-HD Rework System Features***

- Split-Vision Optics with 1.3 Million Pixel HD Video Camera, Electronic Zoom Adjustment, and LED Lighting, Projects Superimposed Images of Component Leads and PCB Pads on 15" Full Color LCD Display
- Independent and Fully Programmable Top and Bottom Hot Air Heating, Essential for BGA and CSP Rework, Controlled by High-Quality Siemens PLC and Temperature Control Module
- Thermal Profiles Divisible Into As Many As Eight Segments for Both Top and Bottom Heating with Programmable Heating Rate, Target Temperature, Dwell Time, and Cooling
- Automated Z Axis Motion with Optoelectronic Vertical Height Sensing for Controlled Desoldering, Lift, Placement, and Resoldering of Delicate SMDs



- Auto-Pickup of SMDs from Component Presentation Nest, and Auto-Positioning of Split-Vision Optics Between Component and PCB Pads, Reduces Cycle Time and Protects Delicate Devices from Handling Damage
- Ultra-Fine Micrometer Adjustments in X, Y, and Theta Axes for Fast, Easy, and Precise Alignment of Component Leads to PCB Pads
- 6-Zone IR Underheater with Programmable Power Settings Eliminates Steep Thermal Gradients Across PCB Surface and Prevents Board Warp and Stress on Adjacent Components and Solder Joints
- High-Efficiency, Rapid IR Heating Technology Reduces Cycle Times and Increases Throughput
- Profile Parameters Include Control of Internal Blower That Provides Lateral Air Flow Across the PCB Surface for Controlled Cooldown Function
- Touch-Screen User Interface with Five Integrated Thermocouple Inputs and Real-Time Temperature Recording Allows On-the-Fly Parameter Adjustment and Simplified Profiling
- Password-Protected User Privileges Separate Operator and Administrative Control Functions
- Software Provides Profile Analysis and Screen Printing Functions via USB Port for Job/Lot Traceability
- On-Board Storage Capacity for Thousands of Leaded and Lead-Free Soldering and Desoldering Profile Parameter Sets for a Multitude of Surface Mount Rework Applications
- Fully Adjustable PCB Holder Accepts Large, Oversized PCBs Up To 550 mm x 500 mm (21.6" x 19.7") and Includes Adjustable Bottom-Side Support Rails
- Convenient Laser Pointer Allows Quick and Easy Positioning of Component/PCB Inline Between Top and Bottom Heater Nozzles
- Full Range of Heater Nozzles Available to Solder/Desolder Components from 3 mm x 3 mm to 80 mm x 80 mm (0.12" x 0.12" to 3.15" x 3.15")
- Internal Pump, Vacuum Generator, and Full Set of Vacuum Pick-Up Nozzles Included...No External Compressed Air or Vacuum Needed

<b>BR790-HD - Specifications</b>	
<b>PCB Specifications</b>	
PCB Size (Minimum)	20 mm x 20 mm (0.79" x 0.79")
PCB Size (Maximum Allowable)	500 mm x 550 mm (19.7" x 21.6")
PCB Size (Recommended Max.)	470 mm x 350 mm (18.5" x 13.8")
PCB Thickness	0.5 mm - 6 mm (0.019" - 0.24")
<b>Component Specifications</b>	
Component Size	3 mm x 3 mm to 80 mm x 80 mm (0.12" x 0.12" to 3.15" x 3.15")
Minimum BGA Ball Pitch	0.3 mm (0.012")
Placement Precision	±0.02 mm (0.0008")
<b>Heating System</b>	
IR Under-Heater	Max. Heat Area - 470 mm x 350 mm (3600 W)
Component Heater (Top Side)	Hot Air (1200 W)
Component Heater (Bott. Side)	Hot Air (800 W)
Temperature Control	K-Type Thermocouple; Closed Loop PID

<b>BR790-HD - Specifications</b>	
<b>Utility Specifications / Facility Requirements</b>	
Main Power Source	220 V $\pm$ 10%/ Single Phase / 50/60 Hz
Total Power Consumption	5.6 KW Max. (25 A)
Machine Dimensions	850 mm L x 750 mm W x 630 mm H (33.5" L x 29.5" W x 24.8" H)
Net Weight	Approx. 70 Kg (154lbs.)

#### **Manncorp BR790-HD BGA Rework System Includes:**

- **1 pc.** BR790-HD BGA Rework System with
  - High-definition (1.3 million pixel) split-vision optics and auto X-Y drive
  - Auto Z-axis motion w/ optoelectronic height sensing
  - Micrometer adjustment for X-, Y-, and theta alignment
  - Motorized theta rotation
  - 6-zone rapid IR underheater
  - Five (5) thermocouple inputs
  - PCB holder and clamping system for boards to 550 x 500 mm
  - Laser pointer for bottom side heater/PCB setup positioning
  - Two (2) adjustable PCB bottom-side support beams
  - Touch-screen controller
  - 15" LCD display

Note: Upper heater nozzles for top-side heating are available in sizes from 7 mm to 58 mm and should be ordered separately to meet your application needs. Nozzles should be approximately 2-3 mm larger than the component.
- **1 pc.** 36 mm x 36 mm bottom heater nozzle
- **1 pc.** 58 mm x 58 mm bottom heater nozzle
- **1 set** Vacuum nozzles w/ adapters and silicone tips
- **5 pcs.** K-type thermocouples with connectors
- 1 set Toolkit
- 1-Year Parts Warranty

## RECOMMENDED OPTIONS

Item No. Part Number Description Unit Price QTY Ext. Price

1 NOZ7x7	<b>Topside nozzle 7 mm x 7mm for BR series</b>
2 NOZ8x8	<b>Topside nozzle 8 mm x 8 mm for BR series</b>
3 NOZ9x9	<b>Topside nozzle 9 mm x 9 mm for BR series</b>
4 NOZ12x12	<b>Topside nozzle 12 mm x 12 mm for BR series</b>
5 NOZ15x15	<b>Topside nozzle 15 mm x 15 mm for BR series</b>
6 NOZ18x18	<b>Topside nozzle 18 mm x 18 mm for BR series</b>
7 NOZ20x20	<b>Topside nozzle 20 mm x 20 mm for BR series</b>
8 NOZ21x21	<b>Topside nozzle 21 mm x 21 mm for BR series</b>
9 NOZ24x24	<b>Topside nozzle 24 mm x 24 mm for BR series</b>
10 NOZ26x26	<b>Topside nozzle 26 mm x 26 mm for BR series</b>
11 NOZ28x28	<b>Topside nozzle 28 mm x 28 mm for BR series</b>
12 NOZ31x31	<b>Topside nozzle 31 mm x 31 mm for BR series</b>
13 NOZ34x34	<b>Topside nozzle 34 mm x 34 mm for BR series</b>
14 NOZ36x36	<b>Topside nozzle 36 mm x 36 mm for BR series</b>
15 NOZ38x38	<b>Topside nozzle 38 mm x 38 mm for BR series</b>
16 NOZ41x41	<b>Topside nozzle 41 mm x 41 mm for BR series</b>
17 NOZ44x44	<b>Topside nozzle 44 mm x 44 mm for BR series</b>
18 NOZ48x48	<b>Topside nozzle 48 mm x 48 mm for BR series</b>
19 NOZ50x50	<b>Topside nozzle 50 mm x 50 mm for BR series</b>
20 NOZ55x55	<b>Topside nozzle 55 mm x 55 mm for BR series</b>
21 NOZ60x52	<b>Topside nozzle 60 mm x 52 mm for BR series</b>