Modular Hot Runner Installation Procedure



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Pre-Installation



The following information is a step by step guide showing how to successfully:

- Install a Modular Mastip Hot Runner system
- → Refer to Appendix A for a list of tools you will require for correct assembly.

Prepare a clean and clear work space.

Ensure the Manifolds, Hot Half Plates, Nozzle, Locator, and component parts are clean.

1.0 Prepare Manifold Housing Plate



Measure critical dimensions

Pocket depth (B) - Measure to the nozzle seat with a depth micrometer to confirm the pocket depth. If correct, the measurement will equal the dimension given on approval drawing.

(Nozzle head height + sub manifold thickness + spacer assembly height + expansion – 0.05mm interference.) The correct value is shown on drawing appendix B.

Record measurements in Appendix B, Table A Measure to the locator spot face (E) on each Sub Manifold with a depth micrometer to confirm the pocket depth. If correct, the measurement will equal the dimension given on the approval drawing.

(Locator height + manifold thickness + spacer assembly thickness + expansion – 0.05mm interference)

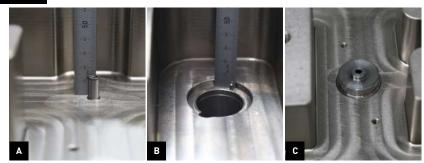
 \rightarrow Record measurements in Appendix B



Measure plate thickness Measure the overall thickness of the manifold housing plate with a micrometer. → Record measurements

 Record measurements in Appendix B

1.3



Insert locators, nozzle dowel pins, manifold dowel pins and guide pins

- A. Fit the guide pins to manifold housing plate.
- B. Measure the height of the nozzle dowel pin with a steel ruler. Ensure the nozzle dowel pin protrudes into the pocket by less than the depth of the dowel slot in the nozzle head.
- C. Measure the height of the manifold dowel pin with a steel ruler to make sure it protrudes into the pocket by less than the depth of the dowel slot in the manifold + clearance under the manifold. Orientate the manifold dowel pin, ensuring the flat edges of the dowel align with the width of the dowel slot in the manifold.
- C. Fit the centre locators in the bottom of the manifold pocket and ensure it they are sitting flat in the bottom of the spot face. Measure to confirm.



Insert nozzle bodies

- A. Insert the nozzle bodies. Be aware of the correct dowel pin orientation. Ensure the nozzle assemblies are complete (heater and thermocouples for MJ/MX to be fitted later) and the nuts are torqued.
- ightarrow Refer to MJ / MX / BX Nozzle Installation Guide
- B. Check LHH cold tip height on one nozzle to ensure you can proceed with assembly.

2.0 Prepare Sub Manifolds



Fit thermocouples to manifold

Fit Thermocouples (TC) to sub manifolds. Make sure there is a small air gap between the TC washer and the manifold surface when fully mounted. This will ensure the TC probe is contacting the bottom of the hole in the manifold. **Do not over tighten.**

2.2

2.1



Fit nozzle side spacer assemblies if applicable

Fit the spacer assembly to the nozzle side of the manifold. Screw the titanium spacer on top of the steel spacer.

If your system has nozzle side spacer assemblies then you must measure the counter bore depth using the same method as nozzle seats in Step 1.1



Fit ceramic terminals to manifold heater

Strip and terminate wire ends and fit them into the smaller hole of the ceramics. Then fit the ceramics to the manifold heater. Point the screws of the ceramics towards the top of the manifold.

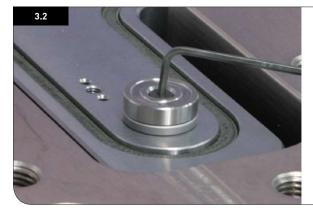
3.0 Insert sub manifolds into manifold pocket



Lower the manifold into the pocket

Using the lifting holes, carefully lower the manifolds into the pocket of the manifold housing plate. Align the manifolds on the centre locators and dowels. Feed the bottom manifold thermocouple wires through the holes in the manifold housing plate. Feed the manifold heater wires through the wire groove. Secure the manifold using the manifold hold down screws. **Finger tighten the manifold hold down screws as they are**

for installation only.



Spacer assemblies

Fit top spacer assemblies. Screw the spacer assembly to the sprue bush side of the manifold. Screw the titanium spacer on top of the steel spacer.



Measure cold clearance

Check the cold clearance between manifold plate and the titanium spacer is equal to the dimension given on the drawing.

→ Record measurements in Appendix B, under cold clearance for manifold housing plate.

Note: With large manifolds it might be necessary to clamp the manifold down to ensure the cold clearance measurements are correct.

4.0 Prepare Back Plate

4.1

Measure critical dimensions

Pocket depth (F2) - Measure to the bottom of the feeder manifold pocket with a depth micrometer to confirm the pocket depth. If correct the measurement will equal the dimension given on approval drawing. (Feeder manifold thickness - sub manifold spacer - manifold housing plate cold clearance + feeder space assembly height + expansion - 0.05mm interference)

 \rightarrow Record measurements in Appendix B

Note: If each face is spot faced then measure to the face.

4.2

Insert feeder manifold dowel pins

- 1) Insert the feeder manifold location dowels into the sub manifolds.
- 2) Measure the height of the manifold dowel pin with a steel ruler to ensure the dowel pin protrudes out of the sub manifold by less than the depth of the dowel slot in the feeder manifold + clearance. Orientate the manifold dowel pin, ensuring the flat edges of the dowel align with the width of the dowel slot in manifold.

4.3

Fit ceramic terminals to manifold heater

Strip and terminate the wire ends and fit them into the smaller hole of the ceramics. Then fit the ceramics to the manifold heater. Point the screws of the ceramics towards the top of the manifold.

5.0 Fit Feeder Manifold to Sub Manifolds

5.1

Lower feeder manifold onto sub manifolds

Lower the feeder manifold onto the sub manifolds using the lifting holes. Align the manifold on the dowels.

5.2

Fit top spacer assemblies

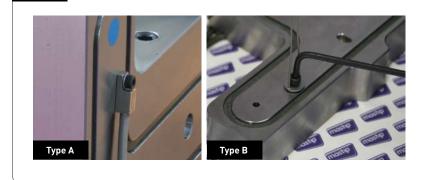
Screw the spacer assembly to the sprue side of the feeder manifold. Screw the titanium spacer on top of the steel spacer.

5.3

5 /

Install sprue bush

Use anti seize and screw the sprue the sprue bush into the manifold and tighten. Slide the sprue bush heater over the sprue bush and point the heater towards the manifold heater exit. Tighten sprue bush heater.



Fit thermocouples to feeder manifold

Fit thermocouple (TC) to sub manifolds. Make sure there is a small air gap between the TC washer and the manifold surface when fully mounted. This will ensure the TC probe is contacting the bottom of the hole in the manifold. **Do not over tighten.** Ensure wires stay clear of spacers and wiring is tidy and free from any areas that will pinch or damage the cables.

5.5

Insert hot half dowel pins

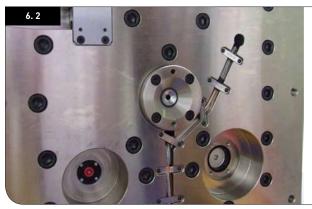
Insert all hot half dowel pins into the manifold housing plate.

6.0 Mount back plate to manifold plate



Lower back plate onto the manifold housing plate

Lower the back plate onto the manifold housing plate over the feeder manifold. Feed the feeder manifold thermocouple wires through the holes in the back plate. Feed the sprue bush heater cable through the locating ring hole. Lower the back plate slowly and line up the hot half dowel pin.



Fit the back plate caps screws

Fit the back plate cap screws and torque screws evenly from the centre out. Guide the manifold thermocouple and sprue bush wires along the wire grooves to the electrical boxes. Fit the wire clips to the wire grooves and ensure the wiring is tidy and free from any areas that may pinch or damage the cables. Fit the locating ring.

6.4

Water Plugs Ensure all water plugs are fitted and sealing.



Mould Plates

Fit the name plates and caution plates using the hammer drive rivets.

7.0 Nozzle Installation

7.3

Complete nozzle assemblies

ightarrow Refer to MJ / MX / BX Nozzle Installation Technical Guides to complete the nozzle assembles.

8.0 Wiring

8.1

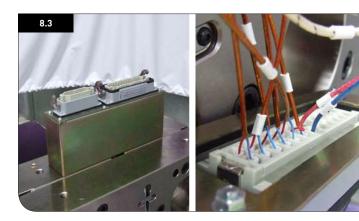
Fit wire clamps

Guide all the nozzle heater and thermocouple wires to the electrical box via the wire grooves and screw the wire clamps onto the plates to retain the wires.

8.2

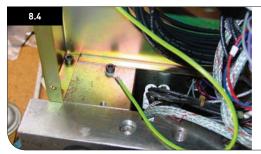
Electrical connectors

Fit the connector plate and boxes to the hot half plates and ensure that the latches are free to function and panels are accessible.



Wiring

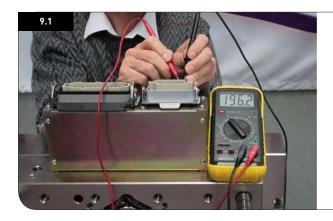
Ensure all cables are numbered correctly and wire all zones according to the wiring diagram. Thermocouple wires: Red (USA: white) = +ve (low numbers in connector) Blue (USA: red) = -ve (high numbers in connector)



Earth Wire Connection

Ensure your power connector is properly earthed to the plates as illustrated in the photo.

9.0 Electrical test procedures and LHH



Measure Resistance (Ω) of heaters

Measure the resistance of each heater. Using a Multi Meter measure across the two pins belonging to the same zone. This is to check and confirm correct wiring and continuity between heaters.

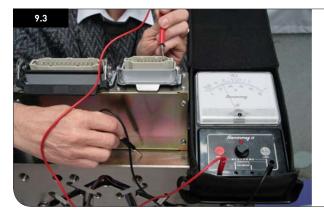
 \rightarrow Record measurements in Appendix B, Table B.



Measure Resistance (Ω) of thermocouples

Measure the resistance of each thermocouple. Using a Multi Meter measure across the two pins belonging to the same zone. This is to check and confirm correct wiring and continuity between thermocouples. Reading must be 1-15 Ω .

 \rightarrow Record measurements in Appendix B, Table B.



Measure heater insulation (M Ω)

Measure between the heater pins and the body of the hot half. Using an Insulation Meter @ 600V AC, Mastip recommends a minimum reading of $2M\Omega$. This is to check and confirm no wires have been pinched and the heaters are free of moisture after shipping.

 \rightarrow Record measurements in appendix B, Table B.



Connect controller unit & confirm wiring order is correct.

Connect temperature control unit to Hot Half. Switch the temperature control unit main power on. Turn on one nozzle at a time and check the corresponding nozzle heats up. Do not heat above 50°C as this will affect the temperature reading of other zones. Turn on manifold zone one and wait for thermocouple reading to settle. Now turn on manifold heater two. If the reading of the first thermocouple starts to rise your thermocouples are wired incorrectly. Repeat for each manifold zone.



Measure Lhh

Measure cold LHH values.

ightarrow Record measurements in Appendix B, Table A.

Repeat this procedure when the manifold and nozzles are in the hot condition.

 \rightarrow Record measurements in Appendix B, Table A.



Check nozzles become rigid

Switch on manifold zones and heat to operating temperature. Check the nozzles become rigid at 40°C less than operating temperature. This will confirm manifold pocket sealing forces are correct. Check and confirm the manifold zones stabilise at set point.

→ Tick box in Appendix B, Table B as each nozzle is confirmed rigid.



Controller Temperature

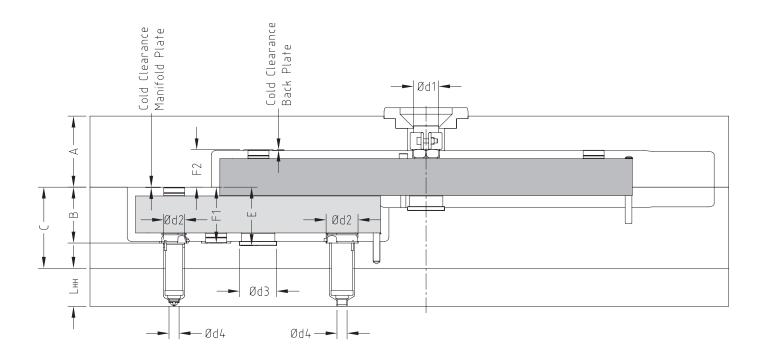
Switch on all zones. Check and confirm operating temperature is reached and stabilises ±2°C.

 \rightarrow Record readings in Appendix B, Table B.

Tools Required

Screwdrivers	Deep Hex Sockets	Insulating Tapes	Digital Multimeter
Side Cutters	Plastic Hammer	Heat-Shrinking Tubing	Temperature Measurement Probe
Long Nose Plier	Depth Micrometer	Cable Marker	Insulation Tester (m Ω @ 500V)
Cable Stripper	Digital Vernier	Hex Key	Outside Micrometers
Crimping Plier	Microball Set	Safety Glasses	Nut Sealing Diameter Gauges *
Torch	Ferrules		

Quality Assurance Check sheets



Project Information								
Distributor								
Customer								
Customer Reference								
Mastip Reference								
Date								

Key	Description	Dimensions (mm)
А	Backplate Thickness	
С	Manifold Plate Thickness	
d1	Sprue Bush Clearance	
d2	Nozzle Location Ø	
d3	Locator Location Ø	
d4	Nut Location Ø	
Е	Locator Spot Face Depth	
	MP Cold Clearance	
	BP Cold Clearance	

Additional Information	Value
Nozzle Cavity Material	
Nozzle Cavity Temp.	
Planned Mould Temp.	
Planned Manifold Temp.	

Key	Description	Dimensions (mm)
F1	Spacer Nozzle Side	
F2	Spacer Sprue Bush Side	
F2	Spacer Sprue Bush Side	
F2	Spacer Sprue Bush Side	
F2	Spacer Sprue Bush Side	

Quality Assurance Check sheets

Table A										
	В	Lŀ	IH	d2						
	Nozzle Spot Face Depth	Cold	Hot	Nozzle Location Ø						
Nozzle 1										
Nozzle 2										
Nozzle 3										
Nozzle 4										
Nozzle 5										
Nozzle 6										
Nozzle 7										
Nozzle 8										
Nozzle 9										
Nozzle 10										
Nozzle 11										
Nozzle 12										
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Nozzle 28										
Nozzle 29										
Nozzle 30										
Nozzle 31										
Nozzle 32										

Quality Assurance Check sheets

			Table B			
Zone	Heater Resistance Ω	Thermocouple Resistance Ω	Heater Insulation $\mathbf{M}\Omega$	Wiring order	Nozzles locked with manifold @ op. temp - 40°C	Controller Temperature
1						
2						
3						
4						
5						
6						
7						
8						
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32						
52						

Modular Manifold

Assembly Procedure

Electrical Charts

Heater Wattage & Length				Heater	Wattage	& Length	BX/S	SX Front	Heater	BX/SX Front Heater			
Manifold Watt Resistance				Manifold	Resistance	Code	Watt	Resistance	Code Watt Resistance				
Heater Length		Ω		Heater Length		Ω	X13045H	220	Ω 240	X27075H	570	93	
300mm	450	118	3	950mm	1650	33	X13055H	230	230	X27085H	570	93	
325mm	500	106		975mm	1700	32	X13065H	240	220	X27095H	680	78	
350mm	550	97		1000mm	1750	31	X13075H	250	212	X27105H	680	78	
375mm	600	89		1025mm	1800	30	X13075H	260	203	X27115H	780	68	
400mm	650	82		1050mm	1850	29	X13095H	275	192	X27130H	780	68	
425mm	700	76		1075mm	1900	28	X13075H	275	192	X27145H	815	65	
450mm	750	70		1100mm	1950	28	-			X27160H	815	65	
	750	71		1125mm	2000	20	X13115H	300	176	X27175H	850	62	
475mm							X13130H	300	176	X27200H	850	62	
500mm	800	67		1150mm	2050	26	X13145H	330	160	X27225H	905	58	
525mm	850	63		1175mm	2050	26	X13160H	330	160	X27250H	905	58	
550mm	900	59		1200mm	2100	26	X13175H	365	145	X27275H	960	55	
575mm	950	56		1225mm	2150	25	X13200H	385	137	X27300H	870	61	
600mm	1000	53		1250mm	2200	25	X13225H	400	132	X27350H	870	61	
625mm	1050	51		1275mm	2250	24	X16045H	290	182	X27400H	960	55	
650mm	1100	49		1300mm	2300	23	X16055H	310	171	X27450H	1050	50	
675mm	1150	46		1325mm	2350	23	X16065H	335	158	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
700mm	1200	45		1350mm	2400	23	X16075H	360	147	M	X Front H	leater	
725mm	1250	43		1375mm	2450	22	X16085H	360	147	Code	Wat	t Resistance	
750mm	1300	41		1400mm	2500	22	X16095H	385	137	MX13045HF	S 220	240	
775mm	1300	41		1425mm	2550	21	X16105H	385	137	MX13055HF	S 240	220	
800mm	1350	40		1450mm	2600	21	X16115H	410	129	MX13065HF	S 260	203	
825mm	1400	38		1475mm	2650	20	X16130H	425	124	MX13075HF	S 280	189	
850mm	1450	37		1500mm	2700	20	X16145H	440	120	MX13095HF	S 310	171	
875mm	1500	36		1525mm	2750	20	X16160H	440	120	MX13115HF	S 340	156	
900mm	1550	35		1550mm	2800	19	X16175H	475	111	MX13130HF	S 380	139	
925mm	1600	34				J	X16200H	485	109	MX13145HF	S 400	132	
							X16225H	500	106	MX13175HF	S 430	123	
	J Front	1					X16250H	520	102	MX16045HF	S 290	182	
Code	Watt	Re	sistance Ω				X19045H	400	132	MX16055HF	S 310	171	
55-109-075	200		265				X19055H	400	132	MX16065HF	S 330	160	
55-109-095	230		230				X19065H	435	122	MX16075HF	S 360	147	
55-109-115	265		200				X19075H	470	113	MX16095HF			
55-109-130	295		179				X19085H	470	113	MX16115HF			
55-109-145	320		165				X19095H	505	105	MX16130HF			
55-109-175	370		143				X19105H	505	105	MX16145HF			
	SX Snru	e Heater					X19105H X19115H	505	98	MX16175HF			
Code			lesistance !	0			X19113H	540	95	MX19055HF			
SX24HRC		250	227	26			X19130H X19145H		95 92	MX19055HF			
SX30HRC		290	230	_				575		MX19085HF MX19075HF			
			200				X19160H	575	92				
	Spr	ue Bush	Heater				X19175H	610	87	MX19095HF			
Cod				Resistance	Ω		X19200H	650	81	MX19115HF			
MANBHT	C 30/20		100	534			X19225H	650	81	MX19130HF			
MANBHT	C 30/30		160	330			X19250H	690	77	MX19145HF			
MANBHT	C 30/40	2	200	267			X19275H	690	77	MX19175HF			
MANBHT	C 30/60		320	165			X19300H	780	68	Su	pplied for	230 V	

Notes

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