

Hot Runner Installation Procedure



smart hot runner solutions

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Pre-Installation



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

- Install a Mastip Hot Runner system
 - Assemble a Mastip Hot Half 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 Manifold, Hot Half Plates, Nozzle, Locator, and component parts are clean.

1.0 Prepare Manifold Housing Plate



Measure critical dimensions

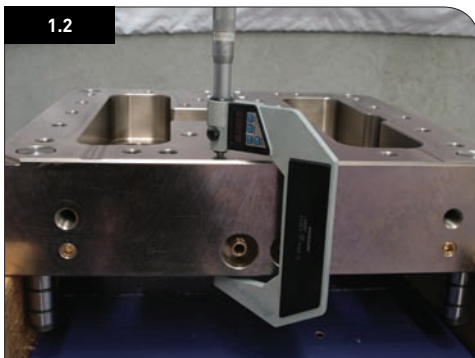
Pocket depth - Measure to the nozzle seat with a depth micrometer to confirm the pocket depth. If correct, the measurement will equal the dimension given on approval drawing.

(Nozzle head height + Manifold thickness + Spacer Assembly height + Expansion – 0.05mm interference)

Measure to the locator spot face with a depth micrometer to confirm the pocket depth. If correct, the measurement will equal the dimension given on the approval drawing.

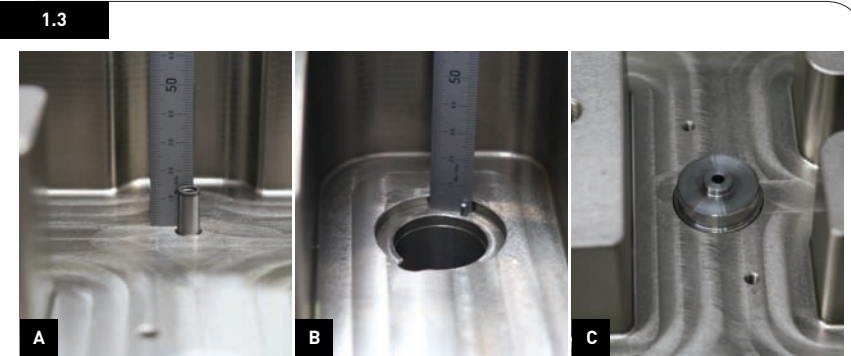
(Locator height + Manifold thickness + Spacer Assembly thickness + Expansion – 0.05mm interference)

→ Record measurements in Appendix B



Measure plate thickness

Measure the overall thickness of the manifold housing plate with a micrometer. Make sure it has been surface ground to within tolerance.



Insert locator, nozzle dowel pin and manifold dowel pin

- 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.
- 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.
- Fit the centre locator in the bottom of the manifold pocket and ensure it is sitting flat in the bottom of the spot face. Measure to confirm.

1.4

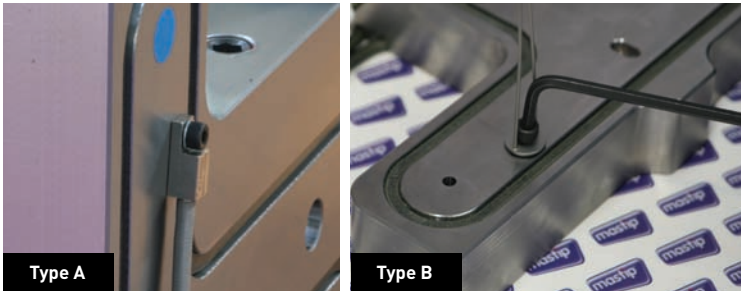
**Insert the nozzle bodies**

Insert the nozzle bodies. Be aware of the correct dowel pin orientation. Ensure the nozzle assemblies are complete (heater and thermocouples for MX to be fitted later) and the nuts are torqued.

→ Refer to MX / BX Nozzle Installation Guide

2.0 Prepare Manifold

2.1

**Fit thermocouples to manifold**

Fit Thermocouple (TC) to the bottom side of the manifold. Make sure there is a small air gap between the TC and the manifold surface when fully mounted. This will ensure the TC probe is contacting the bottom of the hole in the manifold.

2.2

**Fit any bottom spacer assemblies**

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

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

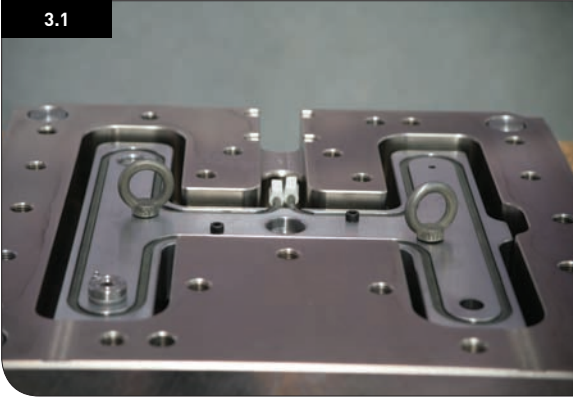
2.3

**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 manifold into pocket

3.1



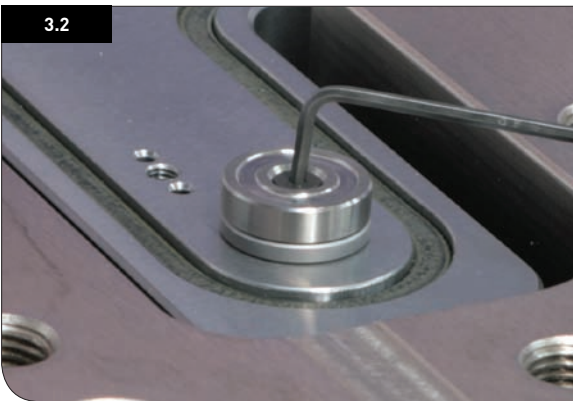
Lower the manifold into the pocket

Using the M12 lifting holes, carefully lower the manifold into the pocket of the manifold housing plate. Align the manifold on the centre locator and dowel.

Feed the bottom manifold thermocouple wire through the holes in the plate. Feed the manifold heater wires through the wire groove. Secure the manifold using the $\varnothing 8.0\text{mm}$ through holes with M6 bolts.

The M6 bolts are for installation only finger tighten.

3.2

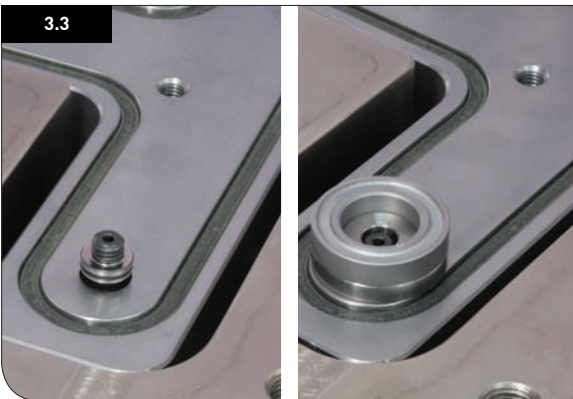


Thermal Gate Only

Fit top spacer assemblies

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

3.3



MVCH Only

Insert seal and spacers

Insert the provided valve pin seal into the manifold bush hole. Place first the titanium spacer and then the steel spacer on top of it.

→ To continue MVCH Installation go to step 4.2

3.4

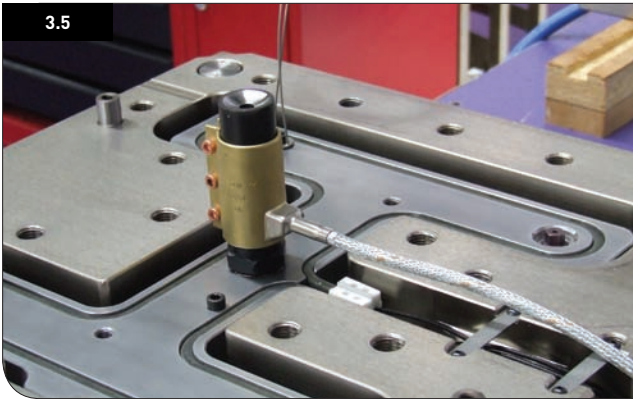


Measure cold clearance

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

→ Record measurements in the table on page 13, Appendix B under cold clearance

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

**Install sprue bush**

Use anti seize and screw 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.

3.6

Fit thermocouples to manifold

Same as 2.1.

If using TC type A feed the wires through the manifold heater groove. Ensure wires stay clear of spacers and wiring is tidy and free from any areas that may pinch or damage the cables.

3.7

Insert hot half dowel pins

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

4.0 Prepare Back Plate

4.1

MVG installation

→ Refer to the MVG Valve Gate System Installation Guide



4.2

MVCH Installation

- 1) Fit back plate to cylinder and fasten using cylinder screws. Ensure correct orientation of the cylinder for the hydraulic fittings.
- 2) Slide pin holder cap over pin and screw onto pin holder. Secure with grub screw.
- 3) Screw lock nut onto pin holder.
- 4) Mount pin assembly to cylinder piston and tighten lock nut.

→ Refer to MVCH Instalation Guide for pin adjustment instructions



5.0 Mount back plate to manifold plate

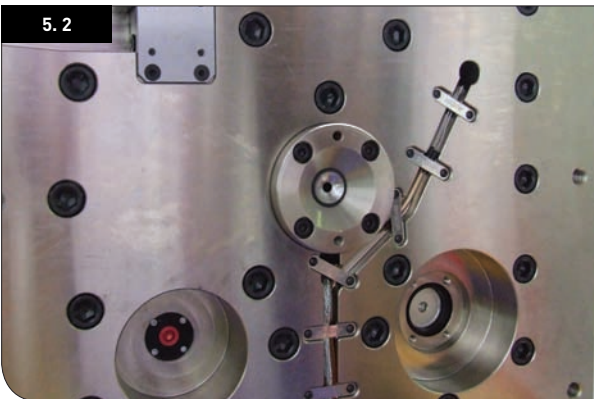
5.1



Lower the back plate onto the manifold housing plate

If using type B TC feed the wires through the TC hole and the sprue heater cables into the wire groove.
Lower the back plate slowly and line up the hot half dowel pins.

5.2



Fit the back plate cap screws and torque screws evenly from the centre out. 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.

5.3



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

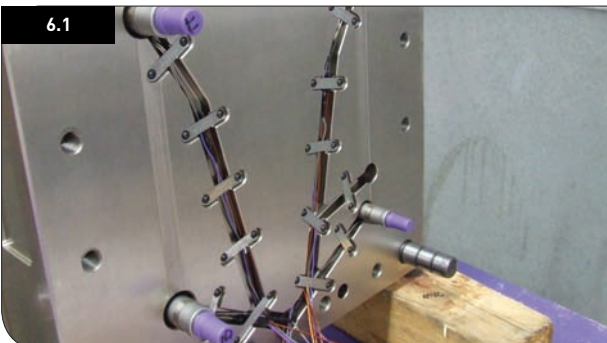
5.4



Install MVCH in back plate
Feed valve gate assembly (see Step 4.2) into rear of plate. Check the orientation of the hydraulic fittings are correct and screw down the cylinder back plate using the countersunk screws.

6.0 Wiring

6.1



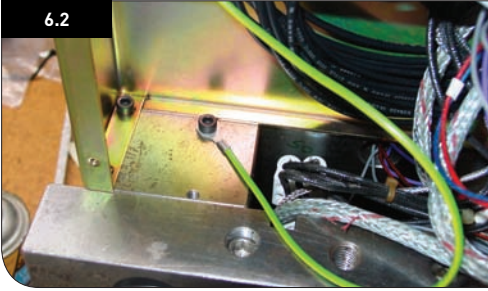
MX Nozzle Only Heater and thermocouple wiring

Install heater and thermocouple according to MX Nozzle Installation Guide.

→ Refer to MX Nozzle Installation Guide

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. Number the wires as per mould drawing and cavity numbering.

6.2

**Earth Wire Connection**

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

Fully Assembled



Fully assembled hot half from sprue side.

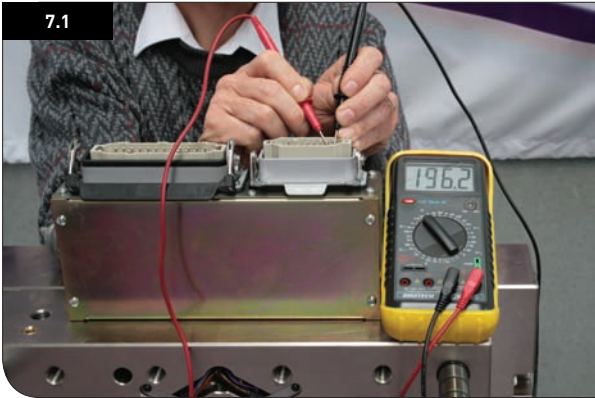
Fully Assembled



Fully assembled hot half showing nozzles, wire slots and wire clamps

7.0 Electrical test procedures and LHH

7.1



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.

- See Appendix C, Electrical charts, for values.
- Record measurements in appendix B, Table B.

7.2

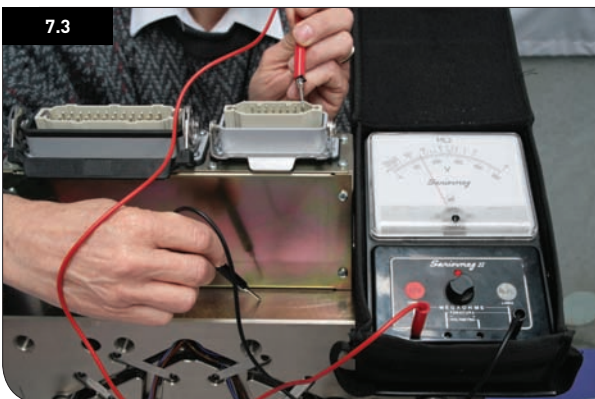


Measure Resistance (Ω) of thermocouples

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 .

- Record measurements in Appendix B, Table B.

7.3



Measure heater insulation ($M\Omega$)

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 Ω . This is to check and confirm no wires have been pinched and the heaters are free of moisture after shipping.

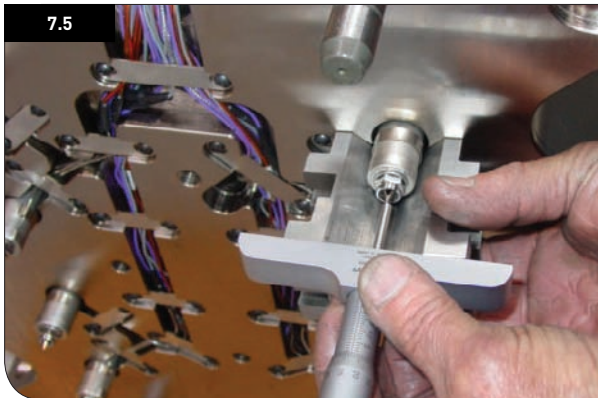
- Record measurements in appendix B, Table B.

7.4



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.

→ Record measurements in Appendix B, Table A.

Repeat this after Step 7.6 in hot conditions

→ 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 $\pm 2^{\circ}\text{C}$.

→ 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 (MΩ @ 500V)



Cable Stripper



Digital Vernier



Hex Key



Outside Micrometers



Crimping Plier



Microball Set



Safety Glasses



Nut Sealing Diameter Gauges *



* Custom made by Mastip

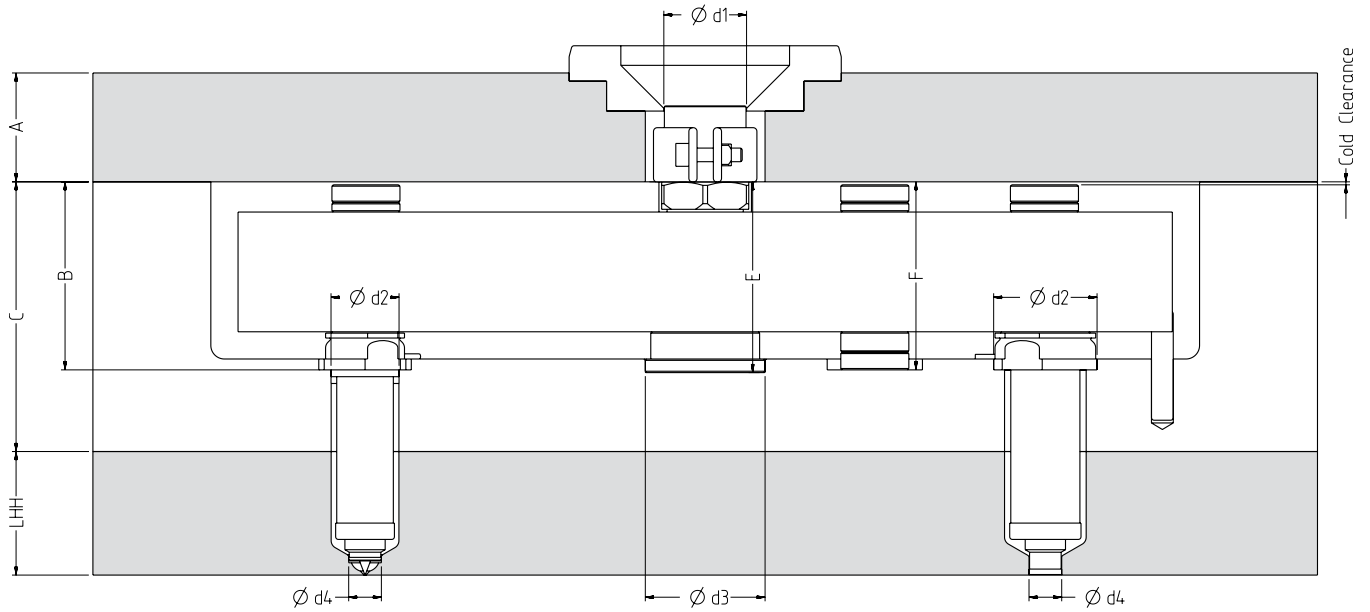
Torch



Ferrules



Quality Assurance Check sheets



Project Information	
Distributor	
Customer	
Customer Reference	
Mastip Reference	
Date	

Key	Description	Dimensions (mm)
A	Backplate Thickness	
C	Manifold Plate Thickness	
d1	Sprue Bush Clearance	
d3	Locator Location Ø	
E	Locator Spot Face Depth	
	Cold Clearance	

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

Key	Description	Dimensions (mm)
F	Spacer 1	
F	Spacer 2	
F	Spacer 3	
F	Spacer 4	

Quality Assurance Check sheets

Table A					
	B	LHH		d2	d4
	Nozzle Spot Face Depth	Cold	Hot	Nozzle Location \emptyset	Nozzle Nut Cavity \emptyset
Nozzle 1					
Nozzle 2					
Nozzle 3					
Nozzle 4					
Nozzle 5					
Nozzle 6					
Nozzle 7					
Nozzle 8					
Nozzle 9					
Nozzle 10					
Nozzle 11					
Nozzle 12					
Nozzle 13					
Nozzle 14					
Nozzle 15					
Nozzle 16					
Nozzle 17					
Nozzle 18					
Nozzle 19					
Nozzle 20					
Nozzle 21					
Nozzle 22					
Nozzle 23					
Nozzle 24					
Nozzle 25					
Nozzle 26					
Nozzle 27					
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 $M\Omega$	Wiring order	Nozzles locked with manifold @ op. temp - 40°C	Controller Temperature
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
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31						
32						

Electrical Charts

Heater Wattage & Length			Heater Wattage & Length			BX/SX Front Heater			MX Front Heater		
Manifold Heater Length	Watt	Resistance Ω	Manifold Heater Length	Watt	Resistance Ω	Code	Watt	Resistance Ω	Code	Watt	Resistance Ω
300mm	450	118	950mm	1650	33	X13045H	220	240	MX13045HFS	225	235
325mm	500	106	975mm	1700	32	X13055H	230	230	MX13055HFS	250	212
350mm	550	97	1000mm	1750	31	X13065H	240	220	MX13065HFS	250	212
375mm	600	89	1025mm	1800	30	X13075H	250	212	MX13075HFS	290	182
400mm	650	82	1050mm	1850	29	X13095H	275	192	MX13095HFS	330	160
425mm	700	76	1075mm	1900	28	X13115H	300	176	MX13115HFS	400	132
450mm	750	71	1100mm	1950	28	X13145H	330	160	MX13130HFS	470	113
475mm	750	71	1125mm	2000	27	X13175H	365	145	MX13145HFS	470	113
500mm	800	67	1150mm	2050	26	X16045H	290	182	MX13175HFS	550	96
525mm	850	63	1175mm	2050	26	X16055H	310	171	MX16045HFS	290	182
550mm	900	59	1200mm	2100	26	X16065H	335	158	MX16055HFS	330	160
575mm	950	56	1225mm	2150	25	X16075H	360	147	MX16065HFS	330	160
600mm	1000	53	1250mm	2200	25	X16095H	385	137	MX16075HFS	400	132
625mm	1050	51	1275mm	2250	24	X16115H	410	129	MX16095HFS	470	113
650mm	1100	49	1300mm	2300	23	X16145H	440	120	MX16115HFS	550	96
675mm	1150	46	1325mm	2350	23	X16175H	475	111	MX16130HFS	550	96
700mm	1200	45	1350mm	2400	23	X19055H	400	132	MX16145HFS	620	85
725mm	1250	43	1375mm	2450	22	X19065H	435	122	MX16175HFS	700	76
750mm	1300	41	1400mm	2500	22	X19075H	470	113	MX19055HFS	400	132
775mm	1300	41	1425mm	2550	21	X19095H	505	105	MX19065HFS	470	113
800mm	1350	40	1450mm	2600	21	X19115H	540	98	MX19075HFS	470	113
825mm	1400	38	1475mm	2650	20	X19145H	575	92	MX19095HFS	550	96
850mm	1450	37	1500mm	2700	20	X19175H	610	87	MX19115HFS	620	85
875mm	1500	36	1525mm	2750	20	X27075H	570	93	MX19130HFS	620	85
900mm	1550	35	1550mm	2800	19	X27095H	680	78	MX19145HFS	700	76
925mm	1600	34				X27115H	780	68	MX19175HFS	850	62
						X27145H	815	65	Supplied for 230 V		
						X27175H	850	62			
						X27225H	905	58			
						X27275H	960	55			

Sprue Bush Heater		
Code	Watt	Resistance Ω
MANBHTC 30/20	100	534
MANBHTC 30/30	160	330
MANBHTC 30/40	200	267
MANBHTC 30/60	320	165

SX Sprue Heater		
Code	Watt	Resistance Ω
SX24HRC	250	227
SX30HRC	290	230

MJ Front Heater		
Code	Watt	Resistance Ω
55-109-075	200	264
55-109-095	230	230
55-109-115	265	230
55-109-130	295	230
55-109-145	320	228
55-109-175	370	231

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