

TROUBLESHOOTING GUIDE

This guide covers the most common moulding problems and remedies.

Machine Setting Alterations	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
Bush / manifold temperature: Increase	X	X			X	X			X	X				X	X	
Bush / manifold temperature: decrease			X	X	X		X	X	X	X		X	X	X	X	X
Injection pressure: increase	X										X			X	X	
Injection pressure: decrease			X	X			X			X	X				X	
Injection speed: increase	X					X			X	X				X	X	
Injection speed: decrease			X	X			X		X	X				X	X	
Packing pressure: increase															X	X
Packing pressure: decrease			X	X	X			X								X
Packing time: increase			X	X										X	X	
Packing time: decrease	X				X		X				X			X	X	
Screw back pressure: increase						X				X						
Screw back pressure: decrease			X	X	X							X	X	X		
Melt decompression: increase			X	X	X											
Cooling time: increase			X	X			X						X	X		
Cooling time: decrease	X	X			X	X		X								
Mould temperature: increase	X	X							X	X						X
Mould temperature: decrease			X	X			X				X	X	X	X		
Damp material—dry it thoroughly			X			X			X							
Insufficient or blocked vents						X	X								X	
Incorrect start-up procedure	X															X

TECHNICAL SUPPORT

Contact your Area Representative , e-mail us at tech-support@fastheatuk.com, or phone the Hot Runner Helpline on 01323-647375 ext 32.



'FLOW THROUGH' BUSHINGS OPERATING MANUAL



Please Note: These instructions are given as a general guide. They may need to be adapted to suit your standard operating procedures, or the specific requirements of the part or polymer being moulded.



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TOOLMAKER'S CHECKLIST

We recommend that the following are checked before the bush is installed: -

Gate (if cut into the cavity)

- the gate land is 0.10 - 0.13mm (.004 - .005")

Bush Installation

- the front fit diameter
- the head fit diameter
- the heater clearance diameter
- the length from the head to the tip
- the allowance for lengthwise bush expansion
- the wire slot position, width & depth (min. 12 x 12mm)
- the keying dowels that prevent bush rotation
- any runner or cavity profile required on the bush tip

Bush

- the tip is undamaged
- the correct tip style and size is fitted
- the heater and thermocouple leads are undamaged
- the bush length is correct
- any ancillary parts supplied are correct
- the nozzle seating radius is correct (if applicable)

All bushes are checked visually, dimensionally and electrically before dispatch.

INSTALLATION

If necessary, bend the coil heater and thermocouple terminations to match the wire slot (see Page 6 for bending parameters). Once bent, do not attempt to straighten or re-bend.

If a front insulating ring or washer has been provided, fit this to the tool first.

Now insert the bush into the tool, taking care to avoid damaging the tip, and laying the wires in the wire slot. Ensure its head seats down properly. Check visually that it is the correct length.

Fit any rear insulating washer that has been provided, and clamp the bush in place with the register ring using a minimum of 4 x M8 screws.

Wire the heater and thermocouple to your controller connector. The most common thermocouple wiring colour codes are given below. Always fit an earth wire for safety.

Run a meter check of the heater, thermocouple and earth connections before connecting to your controller.

Coil heaters have rigid unheated ends and terminations, which can be formed by the customer according to the guidelines shown in the diagram on Page 6.

The examples above show the dimensional parameters for the double bends and U-bends. Parameters for simpler bends can be interpolated from these figures.

The customer is responsible for calculating the appropriate bend position(s) and diameter(s) to suit the heater lengths L1 and L2. Please note that these lengths change, depending on the type of heater used, ie. whether of rectangular or circular cross section.

When bending the heater, bend it once only to the correct form. Do not attempt to straighten or re-bend, because this is likely to cause the sheath to fracture.

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Key to coding used in tables shown below and overleaf.

A Gate freezing off	B Bush inlet freezing off	C Melt drooling from the gate
D Melt stringing from the gate	E Gate vestige too high	F Excessive injection pressure or temperature required to fill cavity
G Melt burning or degrading	H Distortion around the gate	J Surface defects opposite the gate
K Silver streaks on part	L Persistent flow lines	M Persistent flash
N Sink marks on part	P Parts sticking	R Weak weld lines
S Repeated heater failures		

System Faults	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
Gate diameter too small	X				X	X	X	X	X	X	X	X	X			X
Gate diameter too large			X	X	X							X		X		
Gate blocked by contamination	X				X	X	X	X	X	X	X	X	X			X
Gate land length excessive	X				X	X	X	X	X	X			X			X
Heater failed or disconnected	X	X				X										
Thermocouple loose or faulty	X	X	X	X			X	X	X	X		X		X		X
Thermocouple connections reversed			X	X			X	X	X	X		X		X		X
Temperature controller unsuitable or faulty	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Excessive bush tip-to-mould contact	X				X	X			X				X			X
Insufficient bush tip-to-mould contact			X	X				X								
Excessive bush head-to-mould contact		X				X										
Heater incorrectly positioned on bush	X	X	X	X	X	X	X	X	X		X		X			X
Bush tip damaged or worn (if fitted)	X				X	X	X	X	X		X					
Machine nozzle orifice too small						X	X		X	X	X		X			X

Assembly

1. DG & Micropoint: Fit the thermocouple.
2. Slide heater on to bush by placing hand around coil and carefully turning anti-clockwise, while applying pressure where the leads meet the bush.
3. Once correctly positioned, tighten the heater to the bush by turning it clockwise.
4. Slide heater clamps into place—if necessary, 'spring' open with circlip pliers or similar.
5. Refit heater retaining clip (not on LV187 or Micropoint).

Power Requirements

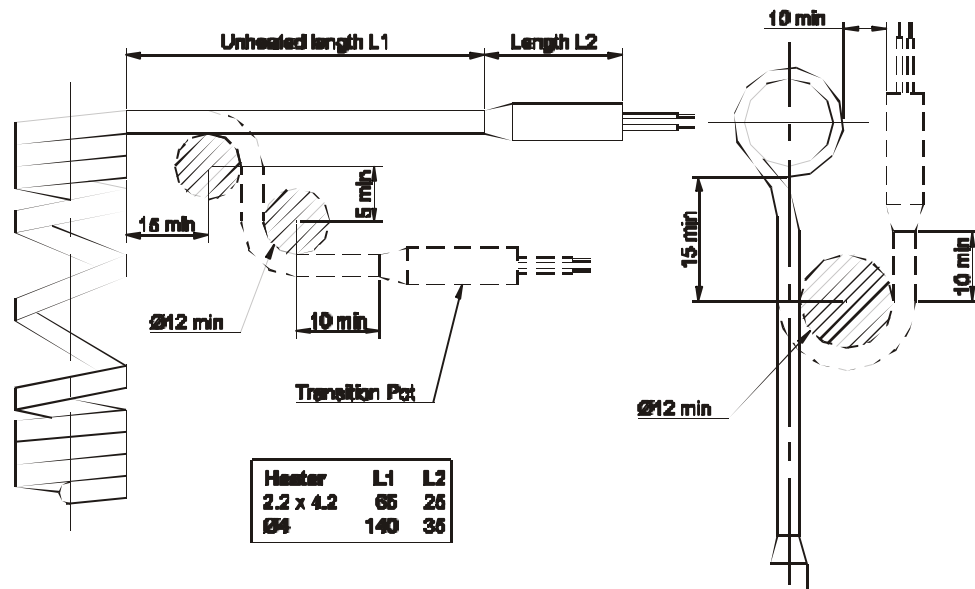
240 Volts AC—15 Amp fuse.

Grounding—Fast Heat bushes utilise the direct contact of the bush, mould plates and machine platens to establish a path for grounding.

Warning

There must be a ground present between the mould 'Hot Half' and the temperature control system or damage may occur to the heater, thermocouple and / or temperature control system.

HEATER TERMINATIONS



ELECTRICAL WIRING

All bushes supplied by Fast Heat are fitted with 240V heating elements and Iron-Constantan (Fe-CuNi, J-Type) thermocouples.

On each heater, the two larger insulated wires are for POWER connection.

The two smaller insulated wires are for THERMOCOUPLE connection.

The most common thermocouple colour coding are:

	UK	Germany	USA	International
Positive (magnetic)	Yellow	Red	White	Black
Negative (non-magnetic)	Blue	Blue	Red	White

If a rear heater band has been supplied with this bush, the two heaters must be operated from a separate temperature controller, and must not be connected together.

TEMPERATURE CONTROLLER

ONLY use recommended temperature control equipment or poor moulding quality and premature heater failure may occur.

Fast Heat temperature controllers (Pulse and Conductor) feature:

- Automatic moisture sensing (Conductor only) and bakeout.
- Automatic faultfinding and diagnostics, to identify heater or thermocouple faults.
- Automatic switching to the currently recorded percentage power level in the event of a thermocouple failure.

START UP PROCEDURE—TAKING CARE EXTENDS HEATER LIFE

- When used in Manifold applications, refer to the Manifold operating manual for additional information.
- Ensure your machine nozzle bore matches the entry bore of the bush — a mismatch can create a dead-spot, resulting in polymer degradation and poor colour changing.
- Bring the machine nozzle into contact with the bush gently, and maintain contact during the 'soak' time with the nozzle heater on.
- Ensure the nozzle radius matches the bush seating radius, or melt leakage may result.
- If your controller does not have an 'intelligent soft start' e.g. Pulse BAKEOUT & EVENSOAK, pre-warm the bush at 85°C for at least 15 minutes to bake out any residual moisture.
- Set the required moulding temperature and allow the bush to 'soak' for at least 5 minutes.
- You are now ready to start moulding.

SETTING MOULDING CONDITIONS

Since starting up a new tool often involves interrupted cycles, it is sometimes necessary to keep

gate-area cooling to a minimum until a regular cycle is established, or gate freeze-off may occur. On occasion, the bush temperature may also have to be increased at initial start-up.

It is important to establish a regular cycle so that fine adjustments can be made to temperature, pressure, speed and time settings to produce good quality mouldings. Always make small adjustments one at a time, and wait for several cycles to observe the effects on the mouldings. Avoid cycle interruptions because they disturb this setting process.

SAFETY PRECAUTIONS

To guard against the possibility of injury from hot polymer, do not work on or inspect the mould until the following steps have been taken.

- Step 1: Use melt decompression to depressurise the hot bush.
- Step 2: Retract the machine nozzle from the hot bush.
- Step 3: Drop the bush temperature by 100°C.

We also recommend the use of goggles and heatproof gauntlets as minimum protection when working on hot manifolds and bushes.

ELECTRICAL SAFETY

This system operates at 240Volts. Ensure there is always an earth connection from the mould to the controller. It is also important to ensure that no water or oil can leak on to the heater elements, thermocouples or wiring.

CYCLE STOPPAGES

In the event of a cycle stoppage exceeding 5 minutes (less with volatile polymers) we recommend the 3 steps described above are taken to prevent polymer degradation.

CHANGING COLOUR

In most cases, new colours can be introduced by simply purging the machine barrel with the new colour, and then moulding the new colour through the bush to sweep out the old colour.

Reduction rings are available for some Pinpoint bush types, for faster colour changing.

SHUTTING DOWN

Treat the hot bush system as an extension of your machine barrel, and follow the same shut-down procedures, as recommended by the polymer suppliers.

RE-STARTING

Follow the START-UP PROCEDURE and start moulding at normal machine settings. In some cases, it is necessary to briefly increase the bush temperatures and / or reduce gate-area cooling in order to start moulding—reset to normal settings once the cycle is established.

GATE ALTERATION

Refer to the Fast Heat catalogue for gate alteration details.

OPERATING & SERVICING INSTRUCTIONS

The Precision and Micropoint Series body designs are similar, but vary in diameter and length.

They feature a replaceable coil heater with integral or separate type 'J' thermocouple.

TIP REMOVAL / INSTALLATION

Removal

Fit the bush firmly in a vice, using the head flats provided.

Use a suitable socket on the tip and turn anti-clockwise to loosen.

It may be necessary to soften the resin first by heating the bush.

Installation

1. Clamp the bush firmly in a vice, using the head flats provided.
2. Apply anti-seize sparingly on to male threads of tip.
3. Note—excess anti-seize may contaminate the resin being processed.
4. Use a suitable socket on the tip and torque to the settings specified below.

Precision: LV187 = 34Nm, LV250 = 41Nm, LV375 = 48Nm

LV625 = 54Nm, DG = 41Nm

Micropoint: Standard = 3.4Nm, WearResist = 4.5Nm

COMPONENT DISASSEMBLY / ASSEMBLY

Disassembly

1. Remove heater retaining circlip (not on LV187 or Micropoint)
2. Slide heater clamps off bush—if necessary, 'spring' open with circlip pliers or similar.
3. Remove heater by placing hand around coil and carefully turning anti-clockwise, while applying pressure where the leads meet the bush.
4. DG & Micropoint bushes are fitted with a separate thermocouple, which can now be removed.

