A1EN

HEATLOCK®

A1EN Assembly Instructions

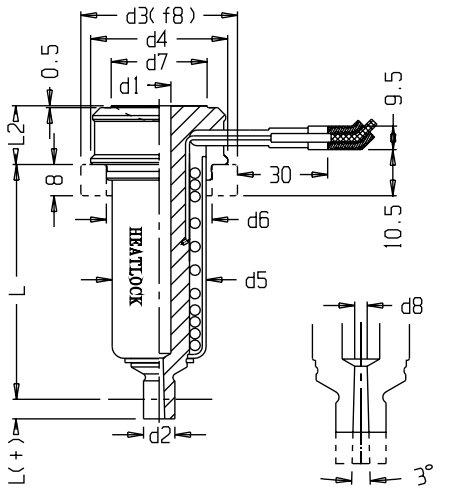
Features:
The maximum permitted contact force from Machine nozzle is 4 Mpa. The A1EN series can be designed for a single nozzle application or a multi-drop application utilizing a hot runner manifold.

The coil heater is designed to provide uniform heat distribution along the length of the nozzle. A concentration of heater windings at both ends of the nozzle compensate for heat losses that occur between the nozzle and mould steel.

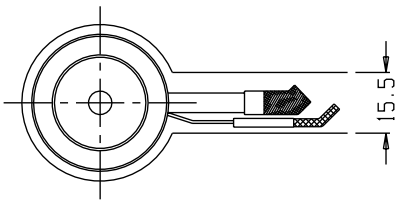
Nozzle bore machining should follow the instructions in drawing 2. Pay attention to length L1. L1 is calculated by adding the nozzle length to the nozzle theoretical heat expansion. Nozzle heat expansion values may be found in table 1.

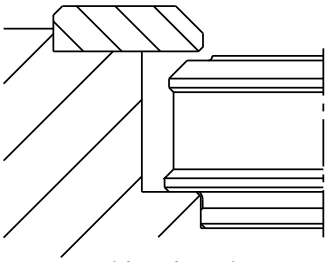
When using the A1EN in a single drop application, make sure that the back of the nozzle does not touch the locating ring. Contact with the locating ring will allow heat from the nozzle to dissipate into the mold.

If the force at which the machine nozzle is pressed against the sprue bushing is greater than that caused by the injection force on the front area of the bushing, no additional force is required to keep the bushing in place axially.

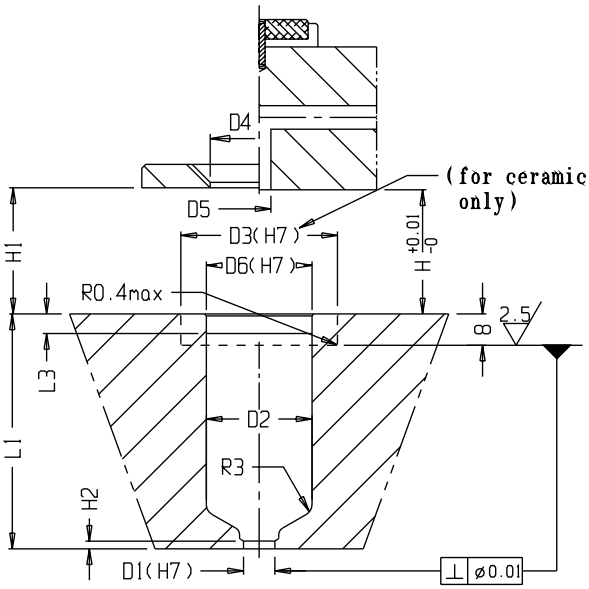


(drawing 1)





(drawing 3)



(drawing 2)

A1EN Series (mm)

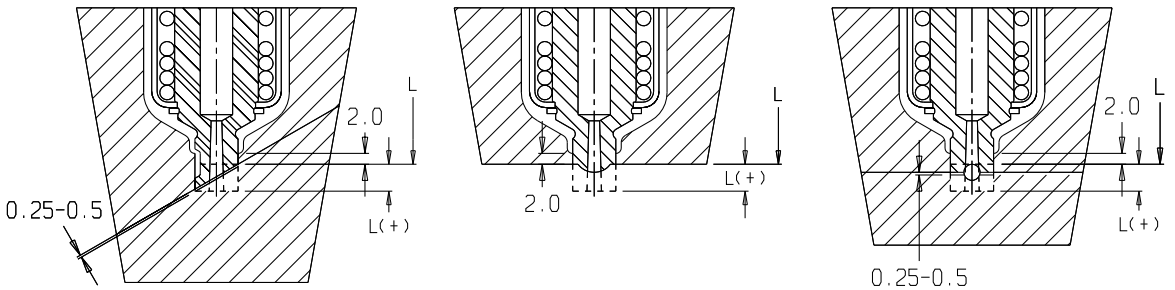
Size	L	L(+)	d1	d2	d3	d4	d5	d6	d7	d8	L2	L3	D1	D2	D3	D4	D5	D6	H	H1	H2
A1EN1040	40																				
A1EN1050	50																				
A1EN1060	60	5	4	6	30	29	20	23	18	1.5	15	5	6	23	30	20	4	23	15	15	max 2
A1EN1080	80																				
A1EN1100	100																				
A1EN1120	120																				
A1EN2040	40																				
A1EN2060	60																				
A1EN2080	80																				
A1EN2100	100	5	6	8	40	35	24	27	24.5	2	15	5	8	27	40	27	6	27	15	15	max 2
A1EN2120	120																				
A1EN2140	140																				
A1EN2160	160																				
A1EN3060	60																				
A1EN3080	80																				
A1EN3100	100																				
A1EN3120	120	10	9	12	62	48	34	39	32	2	15	5	12	39	62	34	9	39	15	15	max 2
A1EN3140	140																				
A1EN3160	160																				
A1EN3180	180																				
A1EN4080	80																				
A1EN4100	100																				
A1EN4120	120																				
A1EN4140	140	20	14	16	56	52	38	44	34.5	3	15	5	16	44	56	37	14	44	15	15	max 2
A1EN4160	160																				
A1EN4180	180																				
A1EN4200	200																				

Front of nozzle

The front surface of the nozzle must not touch mould steel as there must be allowance for free heat expansion (refer to drawing 4). The front of the nozzle is supplied 5mm oversize to allow for machining of the nozzle to match the moulding surface. The nozzle should never be machined to a dimension smaller than L.

A certain amount of cooling is needed at the front end of the nozzle. It must remain at a temperature low enough to allow the plastic to solidify. Too much cooling, however will cause the plastic in the flow channel to be highly viscous further into the bushing. The contact surface at the front end may have to be trimmed depending on, for example, temperature desired and cycle time.

The length of contact at the front of the nozzle is usually 2mm. For high temperature plastics and for longer cycle times, a shorter length may be needed (down to about 0.75mm). The fit between the nozzle tip and the mold will also influence heat transfer where a tight fit will increase heat transfer.

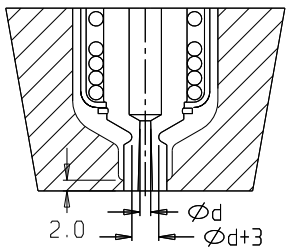


(drawing 4)

For injection moulding with fast-injecting materials, it may sometimes be necessary to have a length of contact greater than 2mm so that sufficient heat can be carried away from the front face. This may mean increasing the temperature of the bushing during startup and reducing it when in continuous operation.

Drawing 5 shows the machining of an undercut that can form a thermal insulation at the front of nozzle.

This function is very effective for high temperature moulding.



(drawing 5)

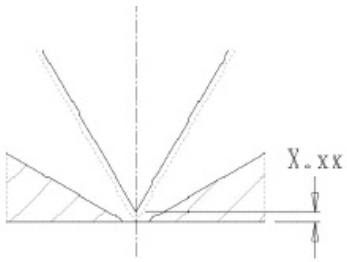
Length of nozzle

Heat expansion of the nozzle must be considered in order to ensure minimum vestige on the part. Expansion values (X.xx) for various temperatures and nozzle lengths are illustrated in the table below:

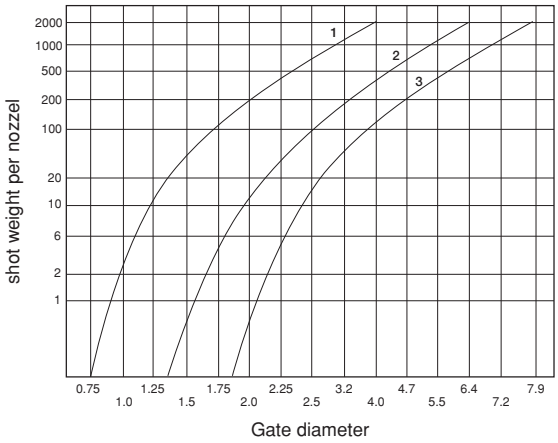
Length Expansion (L1 = L + X.XX) (mm)

T \ L	40	60	80	100	120	140	160	180	200
200	0.08	0.12	0.17	0.21	0.25	0.29	0.33	0.37	0.41
250	0.11	0.16	0.21	0.26	0.32	0.37	0.42	0.48	0.53
300	0.13	0.19	0.26	0.32	0.39	0.45	0.52	0.58	0.64
350	0.15	0.23	0.30	0.38	0.46	0.53	0.61	0.68	0.76

(table 1)



Gate diameter



1. low viscosity :PS PE PP
2. medium viscosity :ABS SAN PA POM
3. high viscosity: PC PMMA

Note: for filled materials ,gate diameter should increase 20%

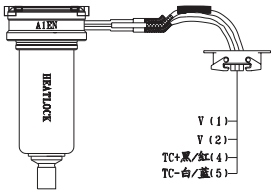
The typical gate diameter is 2mm and can be increased to 5mm. The taper angle is 1.5°.
The diagram above is a guideline for gate diameters needed for various plastics and shot weights.

Note: If the gate diameter is too small, an unnecessarily high bushing temperature will have to be set for the gate not to freeze between shots. The suggested figures are approximate. Gate dimensions may be influenced by the shape of the part and the design of the mould, etc.

The balance between shot weight, injection speed, mould temperature, temperature opposite the gate, cooling around the gate, and injection pressure are all factors that affect gate size. A small gate freezes quicker than a large gate. When injection moulding with very short cycle times and short injection times, it may be necessary to design gate cooling so that the gate area does not overheat.

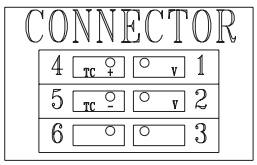
If the sprue bushing is feeding a runner which has a gate into a cavity, it may be suitable to make the bushing gate larger than actually necessary in order to reduce pressure drop and shear. If an electric sprue bushing is used, this will reduce the length of flow in cold steel therefore allowing the reduction of the cross section of the cold runner. This is important in order to get the shortest possible cycle time. Start with a smaller gate than indicated in the table.

Wiring instructions



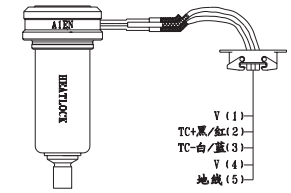
Attention: Only connectors designed to match the temperature Controller are to be used.
Heater and T/C wiring must not be connected in parallel.

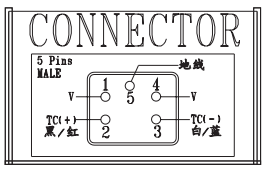
6 Pin Connector



HEATLOCK connections as per illustration at right:
1. connect (1)(2) with heater.
2. connect T/C wire (black/red) with (4).
3. connect T/C wire (white/blue) with (5).
4. connect mould with ground wire & insert.

5 Pin Connector



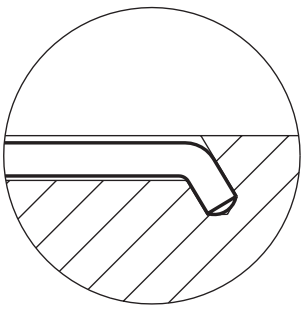


HEATLOCK connections as per illustration at right:
1. connect (1)(4) with heater.
2. connect T/C wire (black/red) with (2).
3. connect T/C wire (white/blue) with (3).
4. connect mould with ground wire & insert.

Instructions for replacement of heater or T/C

Attention: For best performance use HEATLOCK original components.
Disassembly:
1. open lock ring.
2. slide reflector off of nozzle.
3. remove adhesive tape from heater & T/C .
4. carefully slide heater off of nozzle.

Assembly



If necessary, replace T/C by inserting new T/C into small hole at the end of slot. Ensure that the tip is in full contact with the bottom of the bore before bending the T/C along the slot. Install heater onto nozzle ensuring that the T/C is not displaced. Bundle the heater and T/C together using high temperature adhesive tape.

If there are any problems encountered during assembly, please call: (86) 769 8382 5600.