Direct-Flo™
Gold Systems

Instruction Manual
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1.0 INTRODUCTION TO DF GOLD

DESCRIPTION:
DF Systems are the result of 5 decades in hot runner design and manufacturing experience. The DF GOLD series is a refinement complementing the proven DF concept, and is introduced in celebration of our 50th year in business.

Core nozzle designs are comprised of “DFQ” (thread style) and “DFX” (compression style) which are based on the well-established Direct-Flo™ (“DF”) principle. Plastic material is conveyed from the machine nozzle to the cavity by the most direct path thus minimizing stress and reducing pressure.

Six nozzle series are available with lengths up to 600 mm accommodating small to very large shot weights. Each nozzle series has 14 standard gates including hydraulic or pneumatic Valve Gate for highest gate quality.

DF GOLD FEATURES INCLUDE:

Twin Heater
The heater incorporates two separate heating circuits in each nozzle heater. This redundancy provides for uninterrupted production if a single heater circuit failure should occur and allows for easy replacement during a planned maintenance period.

Improved Gating Configurations
Several new tip designs have been added for increased application flexibility. All tips utilize a proprietary coating that yields increased wear resistance.

Color Seal
In the event our standard color change purge process fails to remove all the previous material, the color seal eliminates the potential for any material to take residence in this area.

Manifolds
Our manifolds are constructed of high quality steel and special materials providing low wear properties with honed flow channels to ensure optimum, unobstructed melt flow. Angular manifolds are also available for specialty applications such as two material injection molding.

For manifold application our system drawing is part of this instruction.

OTHER NOTES:
Please pass on this manual and the system drawing to the end user.

Warranty claims only valid if installation and operation to our instructions.

Important mold checks before first test:
– Gate boring detail
– Gate diameter
– Gate cap contact
– Nozzle length expansion
– Electric connection

For questions please call our Applications Department.

Our products are only part of a complete production process. Other components such as plastic, mold or machine have a significant effect on the function of our products.

Warranty is provided only within the framework of our general conditions of sale and delivery.

Subject to alterations.
1.1 INTEGRATED SYSTEMS

1. Preparing to service in the molding machine
   Open mold and remove screws.

2. Preparing to service in the molding machine
   Close mold and change side plates.

3. Ready to service
   Open mold to service.
   Change of gate caps.
   Change of gate tips.
   Change of nozzle thermocouples.
   Change of manifold thermocouples.
   Check electrical and for leakage.

4. Preparing for production
   Close mold and change side plates.

5. Preparing for production
   Open mold and install screws.

6. Production
   Mold is ready for production again.

7. Preparing to service on the work bench
   Remove screws and change side plates.
   Take mold top plate with system from the molding machine.
1.2 NOZZLES: ASSEMBLY

DFX-R

PLEASE NOTE!

a) R max. 2 mm deep.
b) Insulator required.
c) Recommend heater on separate zone.
d) Do not remove.
e) Insulator between heater and locating ring.
f) Guide disk required.

DFQ

PLEASE NOTE!

g) See "Gates."
h) See "Nozzle Heaters."
i) Replace O-Ring always after disassembly.
j) See system drawing.
k) Mold dimension must include expansion.

DFX-M

DFX-E

PLEASE NOTE!

a) B is minimum dimension.
b) Use pin for side location.
c) Use H7/g6 fit.
1.3 GATES: ASSEMBLY

**PLEASE NOTE!**

a) Use anti-size for thread. Keep tips clean!
b) See thread “Torque Force.”
c) Gate diameter per request or per system drawing.
d) Cap contact per request or per system drawing.
e) Cap face must not touch mold after expansion.
f) A/L is minimum dimension.
g) Dimple on request.
h) Fit H7/j6.
1.4 TIP PULLER

NOTES

- The Tip Puller can be ordered from INCOE®.
- First solid plastic on tip thread must get soft by heating up tip or Tip Puller to about 150°C (302°F).
- Screw on Tip Puller and pull tip out of nozzle body by using weight and screw.
- Before assembly of new tip, make sure sealing area is clean.
- Before assembly of gate cap, see section “Gate Assembly.”
1.5 TORQUE FORCES

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<tbody>
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<td>DF 5</td>
<td>50</td>
</tr>
<tr>
<td>DF 8</td>
<td>110</td>
</tr>
<tr>
<td>DF 12</td>
<td>200</td>
</tr>
<tr>
<td>DF 18</td>
<td>250</td>
</tr>
<tr>
<td>DF 25</td>
<td>300</td>
</tr>
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Assembly with DFX Heads only at INCOE® plant.

<table>
<thead>
<tr>
<th>SERIES</th>
<th>NM</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF 3</td>
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<tr>
<td>DF 5</td>
<td>8</td>
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<td>DF 8</td>
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<tr>
<td>DF 12</td>
<td>80</td>
</tr>
<tr>
<td>DF 18</td>
<td>120</td>
</tr>
<tr>
<td>DF 25</td>
<td>250</td>
</tr>
</tbody>
</table>

ATTENTION!

After cold torque force, caps must be retightened at a temperature of approx. 250°C (482°F).

To unscrew caps heat up to approx. 250°C (482°F).

Lb-Ft = Nm x 0.72
250°C = 482°F

Use always high temperature Anti-Size compound for threads.
1.6 NOZZLE HEATERS

**PLEASE NOTE!**

**a)** Unlock before disassembly, lock after assembly.

**b)** Use Anti-Size compound. Heat up for disassembly, if necessary.

**c)** Electric check before assembly.

**d)** Protect wires against over heating.

**e)** Extend TC with Fe-CuNi wire only.

**f)** Consult INCOE® before bending.

**g)** Do not connect TC’s or heaters in parallel.

**VOLTAGE**

Voltage: 230 Volt

Thermocouple: Fe-CuNi

ASA Standard Type J

Color Code:

- white = + (magnetic)
- red = –
### 1.7 NOZZLES: PART LIST

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<thead>
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<th>Pos.</th>
<th>Description</th>
<th>No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>DS Nozzle Body</td>
<td>6</td>
<td>MH Multi-zone Heater</td>
</tr>
<tr>
<td>2</td>
<td>BH Base Heater</td>
<td>7</td>
<td>MTC Multi-zone TC</td>
</tr>
<tr>
<td>3</td>
<td>BTC Base TC</td>
<td>8</td>
<td>R Head with Radius</td>
</tr>
<tr>
<td>4</td>
<td>IR Insulator</td>
<td>9</td>
<td>M Head with O-Ring</td>
</tr>
<tr>
<td>5</td>
<td>CR Guide Disk</td>
<td>10</td>
<td>E Head with Extra Stock</td>
</tr>
<tr>
<td>11</td>
<td>H Head Heater</td>
<td>13</td>
<td>O-Ring</td>
</tr>
<tr>
<td>12</td>
<td>TC Head TC</td>
<td>29</td>
<td>IR Head Insulator</td>
</tr>
<tr>
<td>30</td>
<td>SP Spacer</td>
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</table>

**DF-MZ**

**ORDER**

Please specify: Pos., Description, Nozzle Order Number, System Number.
## 1.8 GATES: PART LIST

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<th>Pos.</th>
<th>Description</th>
<th>Description</th>
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<tbody>
<tr>
<td>14</td>
<td>TCap</td>
<td>Cap Topless</td>
</tr>
<tr>
<td>15</td>
<td>STB/HTB</td>
<td>Cap Standard</td>
</tr>
<tr>
<td>16</td>
<td>STX/HTX</td>
<td>Cap Extra Stock</td>
</tr>
<tr>
<td>17</td>
<td>SRB/CRB</td>
<td>Cap Standard</td>
</tr>
<tr>
<td>18</td>
<td>SRX/CRX</td>
<td>Cap Extra Stock</td>
</tr>
<tr>
<td>19</td>
<td>CTB</td>
<td>Cap Standard</td>
</tr>
<tr>
<td>20</td>
<td>CTX</td>
<td>Cap Extra Stock</td>
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<tr>
<td>21</td>
<td>VTB</td>
<td>Cap Standard</td>
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<tr>
<td>22</td>
<td>VTX</td>
<td>Cap Extra Stock</td>
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<td>VLX</td>
<td>Cap Extra Stock</td>
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<td>26</td>
<td>ZTT</td>
<td>Cap Topless/Tip Assembly</td>
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<tr>
<td>27</td>
<td>ST</td>
<td>Tip</td>
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<td>28</td>
<td>SR</td>
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<td>37</td>
<td>VP</td>
<td>Valve Pin</td>
</tr>
<tr>
<td>38</td>
<td>VPZ</td>
<td>Cylindrical Valve Pin</td>
</tr>
</tbody>
</table>

**ORDER**

Please specify: Pos., Description, Nozzle Order Number, System Number.
1.9 DF3: ASSEMBLY & PART LIST

**Part List**

1. Tip DT 3 ST  
2. Tip DT 3 CT  
3. Cap DC 3 T  
4. Nozzle Body DS 3  
5. Heater BH  
6. Thermocouple BTC

**IMPORTANT**

a) Must be controlled separately.  
b) Mold dimension must include expansion.  
c) Use Anti-Size on thread.  
d) Fit must be H7/j6.  
e) Torque forces,  
   - Tip 4 Nm  
   - Cap 6 Nm  
   - Nozzle Body 30 Nm  

  $Lb$-Ft = Nm x 0.72  

Assembly according to our system drawing.
1.10 DMT MULTI-TIP: PART LIST

**DMT-R**

1. Tip DT 5 ST
2. Tip DT 5 CT
3. Cap DC 5 T
4. Nozzle Body DMT
5. Snap Ring SPA 38
6. Heater H 38060/070/080
7. TC BTC 1-60/1-70/1-80
8. Heaterband HBTJ 5818
9. O-Ring 610
10. Disk DMT-R
11. Insulator DH 18
12. Screw M5x16

**DMT-M**

1. Insulating ring required.
2. Must be controlled separately.
3. Mold dimension must include expansion
4. Always replace after disassembly.
5. Use Anti-Size on thread.
6. Torque force 8 Nm.
7. Fit must be H7j6.

Assembly according to our system drawing.
1.11 DFQ/DFS MANIFOLD: ASSEMBLY

NOTES
a) Must locate and seal.
b) Contact max. 0.6 mm.
c) Clearance for expansion to system drawing.
d) Use anti-size for all threads.
e) Tighten.
f) Mold dimension must include expansion.
g) For PP, PE, PS only.
h) Protect all wires from heat.
i) Consult INCOE® before removing.
j) Wired and checked to customer specification.
k) Fe-CuNi white = + / red = –
l) If needed, before assembly to mold, heat up manifold to approx. 100°C (212°F).
m) Extend TC only with Fe-CuNi wire.
n) Before assembly check all zones individually at approx. 100°C (212°F).

PLEASE NOTE!
Refer to system drawing for assembly. Should you have any questions please contact our Applications or Service Department.
1.12 DFX MANIFOLD: ASSEMBLY

NOTES

a) Must locate and seal.
b) Contact max. 0.6 mm.
c) Clearance for expansion to system drawing.
d) Use anti-size for all threads.
e) Tighten.
f) Mold dimension must include expansion.
g) For PP, PE, PS only.
h) Protect all wires from heat.
i) Consult INCOE® before removing.
j) Torque Forces
   M6=14 Nm, M8=35 Nm,
   M10=70 Nm, M12=120 Nm
k) Fe-CuNi white = + / red = –
l) Offset dowel.
m) Extend TC only with Fe-CuNi wire.
n) Before assembly check all zones individually
   at approx. 100°C (212°F).
o) Supports with nozzles.
p) Prevent damage to O-Rings and seal areas.

PLEASE NOTE!

The system drawing is
binding for assembly.
Should you have any
questions please contact
our Applications or
Design Department.
1.13 DFQ MANIFOLD: PART LIST

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<tbody>
<tr>
<td>1</td>
<td>MNQ Manifold Block</td>
<td>8.1</td>
<td>IR Insulator</td>
</tr>
<tr>
<td>2</td>
<td>RHK Tubular Heater</td>
<td>9</td>
<td>ISI-412 Thermocouple Block</td>
</tr>
<tr>
<td>3</td>
<td>DSTO Upper Support</td>
<td>10</td>
<td>M Screw</td>
</tr>
<tr>
<td>4</td>
<td>M Screw</td>
<td>11</td>
<td>DSTM Center Support</td>
</tr>
<tr>
<td>5</td>
<td>BTC Thermocouple AB</td>
<td>12</td>
<td>DSTU Lower Support</td>
</tr>
<tr>
<td>6</td>
<td>BH Heater AB</td>
<td>13</td>
<td>M Screw</td>
</tr>
<tr>
<td>7</td>
<td>DN Extension Nozzle Heated</td>
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<td>DN Extension Nozzle Unheated</td>
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<td>SR Locating Disk</td>
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**ORDER**

Please specify: Pos., Description, System Number.
1.14 DFX MANIFOLD: PART LIST

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<td>8.1 IR Insulator</td>
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<td>9 ISI-412 Thermocouple Block</td>
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<td>10 M Screw</td>
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<td>11 DSTM Center Support</td>
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<td>BTC Thermocouple AB</td>
<td>12 DSTU Lower Support</td>
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<tr>
<td>6</td>
<td>BH Heater AB</td>
<td>13 M Screw</td>
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<td>7</td>
<td>DN Extension Nozzle Heated</td>
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ORDER
Please specify: Pos., Description, System Number.
1.15 DFS MANIFOLD: PART LIST

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<td>MNQ Manifold Block</td>
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<td>IR Insulator</td>
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<td>RHK Tubular Heater</td>
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<td>ISI-412 Thermocouple Block</td>
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<td>DSTO Upper Support</td>
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<td>DSTM Center Support</td>
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<td>BTC Thermocouple AB</td>
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<td>BH Heater AB</td>
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<td>M Screw</td>
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<td>DN Extension Nozzle Heated</td>
<td>7.1</td>
<td>Extension Nozzle Unheated</td>
</tr>
<tr>
<td>8</td>
<td>SR Locating Disk</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.16 DFQ/DFX/DFS MULTIPLE VALVE GATE: ASSEMBLY

NOTES

- Pressure max. 10 bar
- Pressure max. DF5 = 8 bar, DF8 = 15 bar, DF12/18 = 40 bar, DF25 = 50 bar
- Temperature max. 50°C (122°F)
- Further assembly to “DFQ/DFS Assembly Manifold” and “DFX Assembly Manifold”
1.17 VALVE PIN ADJUSTMENT

**Pos. Description**

1. Hex Wrench
2. Locking Wrench
3. Piston Wrench
4. Snap Ring
5. Mold Plate
6. Screw
7. Holding Disk
8. Lock Screw
9. Piston
10. Valve Pin Head
11. Valve Pin
12. Pneumatic Cylinder
13. Hydraulic Cylinder
14. Gate

**NOTES**

**Adjustment**
Use 3, 7 and 6 for stop position of 9. Screw in 11 with 10 and 1 up to stop position at 14.

**Locking**
Screw in 8 with 2, hold 10 with 1 and lock.

**ORDER**
Please specify: Pos., Description, System Number.
1.18 DSV PIN ADJUSTMENT

1) Turn on mold and DSV cooling
2) Heat DSV and nozzle to operating temperature
3) Energize piston to top position (pin closed)
   and hold pressure to prevent piston rotation
4) Use hex wrench to adjust coupling pin (pin to closed position)
5) Hold hex wrench in place and use locking wrench to tighten lock screw
6) Turn off temperature to DSV and nozzle
7) Continue to cool mold and DSV for at least 15 minutes
1.19 DFX/DFX/DFS MULTIPLE VALVE GATE: PART LIST

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
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<td>PE Pneumatic Unit</td>
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<td>2</td>
<td>PDS Pneumatic Seal Kit</td>
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<tr>
<td>3</td>
<td>DE Pin Seal</td>
</tr>
<tr>
<td>4</td>
<td>VK Valve Pin Head</td>
</tr>
<tr>
<td>5</td>
<td>KS Lock Screw</td>
</tr>
<tr>
<td>6</td>
<td>VP Valve Pin</td>
</tr>
<tr>
<td>7</td>
<td>HE Hydraulic Unit</td>
</tr>
<tr>
<td>8</td>
<td>HDS Hydraulic Seal Kit</td>
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</table>
1.20 SINGLE VALVE GATE: ASSEMBLY

NOTES

a) Insulator must always exist.
b) R max. 2 mm deep.
c) Control heater separately.
d) Locking screw must be tight (use INCOE® wrench).
e) Mold dimension must include expansion.
f) Pneumatic max. 10 bar.
g) Hydraulic
   DSV 12, DSV 18 max. 40 bar,
   DSV 8 max. 15 bar.
h) Temperature max. 50°C (122°F).
i) See gates.
### 1.21 SINGLE VALVE GATE: PART LIST

<table>
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<tbody>
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<td>Valve Pin</td>
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<tr>
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<td>Front Thermocouple</td>
<td>11</td>
<td>Pin Seal</td>
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<tr>
<td>3</td>
<td>Front Nozzle Body</td>
<td>12</td>
<td>Manifold Block</td>
</tr>
<tr>
<td>4</td>
<td>Front Locating Disk</td>
<td>13</td>
<td>Support</td>
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<td>5</td>
<td>Front Insulator</td>
<td>14</td>
<td>Cartridge Heater</td>
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<td>6</td>
<td>Tip</td>
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<td>Thermocouple</td>
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<td>Rear Heater</td>
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<td>Lock Screw</td>
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2.1 ELECTRIC CONNECTION

- Unitized Systems are pre-wired and checked to customer specification.
- Please check if plug assignment fits to your Temperature Controllers.

PLEASE NOTE!

a) All TC’s are Fe-CuNi
   - white = + (magnetic)
   - red = -

b) Refer to control zone numbers on system drawing.
c) Consult INCOE® before changing the heater configuration specified on system drawing.
d) Never connect TC’s together.
e) TC extension with Fe-CuNi wire only.
f) Protect all wires from heat, insulate with silicon or glass fiber.
g) During system assembly protect all wires from pinching.
h) Electric plug on side or top of mold. Protect from heat.
i) Always final bench test, heat up each zone individually to approx. 100°C (212°F) and check for proper function and number assignment.

2.2 START UP

Assembly errors or errors with electric wiring and start up may cause considerable damage and cost.

Therefore it is in your best interest to avoid these types of errors. If you are in doubt, please call our applications department.

RECOMMENDED TEMPERATURE CONTROLLER FEATURES

- Minimum voltage output after attaining set point temperature, increases heater life.
- Automatic parameter adaptation, for even control of quick and slow reacting zones.
- Second set point for reduction or increase of temperature, at interruptions and for start up.
- INCOE® Controllers recommended.
- Use right temperature for plastic material and mold (see 2.4).
- Adjust controller without soft start option to 100°C (212°F) for approx. 10 minutes, after this change to desired set point.
- Start injection approx. 5 minutes after attaining operating and mold temperature.
- When using quick freezing plastic material (PA 6.6) increase start up temperature for nozzles by approx. 20°C (68°F) and then reduce gradually.
- For drooling or stringing: use decompression.
- Generally, production should run with lowest possible manifold and nozzle temperatures.

- Automatic dry-out of damp heaters (soft start).
- Continuous voltage output, controls even and increases heater life.
2.3 START UP: VALVE GATE SYSTEMS

- Always open cooling of hydraulic cylinders first (cylinder temperature maximum 50°C (122°F). Only after this switch on heaters.
- Pay attention to maximum pressures as per operating instructions (see 2.4, next page).
- When oil pressure from machine, fix mechanically the pressure limiting valve to maximum pressure (seal).
- Only after attaining operating temperature check needle function (otherwise risk of gate damage).
- For valve pin control INCOE® Gate Sequence Controller recommended.

INTERRUPTIONS

- During interruptions longer than 10 minutes reduce system temperature by approx. 50°C (122°F) to avoid material burning. When using INCOE® controller switch to second set point.
## 2.4 PROCESS TEMPERATURES

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These temperatures are for standard materials. Depending on application and material type variations are possible.
3.1 TROUBLESHOOTING: NOZZLES

GATE FREEZING (SEE 1.3, 2.2, 2.3, 2.4)
• Check mold and operating temperatures.
• Gate tip too short (damage, wear).
• Gate too small.
• Too much cap contact.
• Extra-stock XS is protruding.
• Cap front has mold contact.
• Mold boring dimensions not to specification.
• Foreign particles in gate.
• Molten mass swells up out of gate and freezes.
• Injection cycle irregular or too long.

GATE CAP BROKEN (SEE 1.3)
• Cap front or cone touching mold.

SINGLE NOZZLE FREEZING AT REAR HEAD (SEE 1.2)
• Head heater or TC defective.
• Head heater has contact with mold locating ring or mold.
• Head insulator ring missing.
• Mold locating ring inner diameter too small (too much contact).

GATE CAP LEAKAGE (SEE 1.2, 1.3)
• Damaged diameter.
• Mold boring dimensions not to specification.
• Diameter of cap damaged due to missing guide disk.

SINGLE NOZZLE CRACKS AT NOZZLE HEAD (SEE 1.2)
• Depth of radius wrong or too deep.
• Machine nozzle eccentric.
• Machine nozzle force too high and too fast.

NOZZLE DOES NOT ATTAIN SET POINT
• Defective or damaged TC.
• Heater or cap cone has contact with mold.
• Gate seal leak.
• Defective or damaged heater.

GATE IS DROPPING, DROOLING OR STRINGING (SEE 1.3, 2.2)
• Hot runner temperature too high.
• Gate too big.
• Mold too warm for cycle time.
• Missing of decompression.
• Cap contact too small (gate too hot).
• If gate CT or SF-CT, (open gate) change to ST or SF-ST. (Torpedo).

CAP FRONT IS STICKING
• Mold cooling too low.
• Cap contact too small.
• Check gate modification to Topless insert.

GATE VESTIGE TOO LONG (ST/CT)
• Normal length of ST/STT approx. 50% of gate diameter.
• Normal length of CT/CTT approx. 100% of gate diameter.
• Tip too short (wear, damage).
• XS Extra stock not removed to A/L length in center.
• Gate boring not to specification.
• Mold boring not to specification.

BURN MARKS ON MOLDED PART (SEE 2.4)
• System temperature too high.
• Residence time in system too long (interruptions).
• Too much regrind material in plastic material.
• Check screw and barrel.
• If shear sensitive plastic material (flame retardant) modification to gate SF-CT or CT.
• Dead spots in system, check channels (call INCOE® Service).

COLOR MARKS ON MOLDED PART
• Temperature sensitive material
• Poorly blended color
• Old color from former application in machine
• Dead spots in system, check channels (call INCOE® Service)
• Old color in system. Follow these steps to purge color:
3.1 TROUBLESHOOTING: NOZZLES (CONT’D)
1. Close mold cooling at injection side.
2. Raise hot runner system temperature by approx. 20°C (68°F) (above processing temperature) and wait 10 minutes (only 5 minutes for POM).
3. Lift off the injection unit. Increase temperature of the injection unit heaters by approx. 30°C (86°F).
4. After reaching the temperature, clean the injection unit. Use caution with heated parts.
5. Clean transfer between machine nozzle and extension nozzle (hot runner).
6. Inject approx. 3 to 4 shots, with slow speed. For small shot weights inject the plastic material through the open mold. There must be no visible color marks from old color.
7. For valve gate systems, move the pin 2 to 3 times (open-close) while this procedure, without injecting material.
8. Restart mold cooling and readjust normal system temperature (hot runner and injection screw)
9. Wait 10 minutes (only 5 minutes at POM).
10. Restart with production.

3.2 TROUBLESHOOTING: NOZZLES AND MANIFOLDS

LEAKAGE BETWEEN NOZZLES AND MANIFOLD, OR ON EXTENSION NOZZLE
• See 1.11, 1.12.

EXTENSION NOZZLE FREEZING (SEE 2.4)
• Heater or TC defective.
• Too much contact of locating ring.

SET POINT TEMPERATURE VARIATION (SEE 2.2)
• Controller calibration.

• If synchronous to injection cycle > system contact not constant (stripper plate).
• Defective or damaged TC.

THREADS DO NOT MOVE
• Heat up (call INCOE® Service).
• Use always Anti-Size on all threads.

3.3 TROUBLESHOOTING: VALVE GATES

BURNED MATERIAL IN CHANNELS
• Cleaning in refining bath (call INCOE® Service).

VALVE PIN DOES NOT MOVE
• Required operating
• Temperature not attained
• Check cylinder seals.
• Check nozzle and manifold heaters.

GATE STICKING
• Reduce temperature.
• Gate boring not to specification.
• Inadequate cooling for desired cycle time.

GATE NOT CLOSING WELL
• Raise temperature.
• Close sooner.
• Defective or damaged at cylinder seals.
• Check valve pin adjustment.

CYLINDER LOCKING NUT BECOMES LOOSE
• Locking surface not clean (call INCOE® service).
• Use INCOE® locking wrench.

VALVE PIN LEAKAGE
Adjustable Type
• Readjust adjustable sleeve seal after heating up, valve pin must still move by hand.

Non Adjustable Type
• Seal diameter out of specification due to wear — replace.

OIL LEAKAGE
• Cylinder seals damaged by too high temperature or too high pressure.
3 Prices, Payment and Risk of Loss

A. Prices contained in Seller’s published price lists, if any, are subject to change without notice. Prices contained in individual written quotations or proposals are firm only for a period of (30) days from the date of the quotation after which Buyer should inquire of Seller as to their validity and request a written confirmation or revision. Prices do not include taxes and Buyer shall pay all applicable sales or other taxes levied with respect to Goods (and replacements) and shall pay all applicable sales or other taxes levied with respect to Services. All prices are in United States dollars. Buyer shall pay all government fees levied on the installation and inspection of the Goods. Buyer shall pay upon receipt all invoices rendered by Seller for any such items Seller may pay for and for the Goods.

B. This Agreement is for a shipment contract and the Goods shall be delivered F.O.B. Seller’s dock. Whether or not Seller prepaids shipping charges, risk of loss passes to Buyer upon tender of the Goods to a carrier. Seller’s breach of the Agreement shall not affect the passing of the risk of loss to Buyer notwithstanding any provision of law to the contrary.

C. Seller may unilaterally increase prices to cover increased costs (plus reasonable overhead and profit), changes in law, and referencing this transaction (all of which constitute the “Agreement”). The AGREEMENT SHALL BE GOVERNED, CONSTRUED AND ENFORCED UNDER THE LAWS OF THE STATE OF CALIFORNIA INCLUDING THE UNIFORM COMMERCIAL CODE IN FORCE ON THE INITIAL DATE OF THE AGREEMENT (“UCC”), EXCEPT AS PROVIDED HEREIN. The U.N. Convention on the International Sales of Goods shall not apply. Any services to be provided hereunder, whether or not they are otherwise ancillary to and part of a sale of goods (i.e., separate units), shall be considered ancillary to a sale of goods and the UCC shall apply to all goods and services to be provided hereunder (“Goods”). THE CONTRACTS OF MICHIGAN SHALL HAVE EXCLUSIVE JURISDICTION OVER THE PARTIES AND THE CLAIMS ARISING UNDER OR RELATED TO THE AGREEMENT. The parties stipulate to the convenience of Michigan courts in general, and the Oakland Circuit Court in particular, as to all litigation. Any declaration of unenforceability of a provision shall be as narrow as possible and shall not affect the enforceability of the other provisions.

4 Delay of Shipment or Performance Excused for Various Reasons

A. If shipment of any item or other performance by Seller is delayed at the request of or due to the fault of Buyer, Seller may at its option hold the item at the place of manufacture at the risk and expense of the Buyer from the time it is ready for shipment. In the event of any such delay in shipment, full and final payment for an item shall be due and payable thirty (30) days from the date the item is ready for shipment, if Seller’s obligation to accommodate the Buyer by holding such item, the Buyer shall accept shipment immediately.

B. Dates for Seller’s performance are estimates only. In addition, the Seller shall not be in default because of its delay or failure to deliver or perform resulting, in whole or in part, from: (i) any foreign or domestic embargoes, seizures, acts of God, insurrections, war, or the adoption or enactment of any law, ordinance, regulation, rule or order, or (ii) the lack of usual means or transportation, fires, floods, explosions, strikes or any other accidents, contingencies, or events, at the Seller’s or its supplier’s plant or elsewhere (whether or not beyond the Seller’s control) which directly or indirectly interfere with, or render substantially more burdensome, Seller’s production, delivery, or performance.

5 Inspection, Testing and Rejection

A. If the Agreement expressly provides for Buyer’s inspection and/or acceptance of the Goods, Seller’s standard test and procedures conducted by Seller in its discretion shall be the criteria for inspection and/or acceptance, unless other specific procedures have been specified in the Agreement.

B. All drawings, specifications, technical documentation, samples, prototypes and Goods shall be deemed approved and/or accepted by Buyer if Buyer does not provide a written objection and/or rejection within seven (7) days of receipt or other reasonable time established by Seller. Any objection and/or rejection by the Buyer must be in writing and state with specificity all defects and non-conformities upon which Buyer will rely to support its rejection. ALL DEFECTS AND NON-COMFORMITIES WHICH ARE NOT SO SPECIFIED ARE WAIVED.

6 Installation and Start Up

All Goods shall be assembled and installed by and at the expense of the Buyer. Seller may furnish, upon request and without additional cost or liability to Seller, written instructions for maintaining, and operating the Goods. At Buyer’s request and cost, Seller may furnish personnel and equipment necessary for the installation of the Goods. If shipment of any item or other performance by Seller is delayed at the request of or due to the fault of Buyer, Seller may at its option hold the item at the place of manufacture at the risk and expense of the Buyer. In the event of any delay in shipment, full and final payment for an item shall be due and payable thirty (30) days from the date the item is ready for shipment, if Seller’s obligation to accommodate the Buyer by holding such item, the Buyer shall accept shipment immediately.

7 Software License

The Seller grants the Buyer, for its internal use only, a non-exclusive perpetual license (“License”) of all user manuals, software programs, firmware, and storage media (“Software”) provided by the Seller in conjunction with the Goods with which the Software is provided, for the sole purpose of the operation of the Goods. This License terminates automatically if Buyer is in default of its obligations. The Software may be provided in machine readable object code only. Licensee may make and keep one copy of the object code, if provided by Seller, for backup purposes. When making a copy, the Buyer shall reproduce all Seller’s copyright or patent notices in all forms originally included in the Software. Buyer shall not make any effort to obtain or reproduce the Software’s source code. Title and all ownership rights to the Software remain with Seller, its licensors, or its suppliers. The Software is the sole property of Seller. The Software and all documentation,蹬itious, or copies of蹬ition, or any part thereof or any other device or product. Licensee may not assign or transfer the Software as a part of a transfer of the Goods or to a third party. The Software is provided by the Seller for the Buyer’s internal use only and the Buyer shall maintain the confidential nature of the Software and related materials and protect them against disclosure or improper use. Buyer shall pay all taxes based on the Software or use of the Software, however designated or levied, except those based on Seller’s net income. All disclaimers and limitations applicable to the Goods apply to the License.

8 General Express Warranties

A. Seller warrants to Buyer only, that Goods (or portions thereof manufactured by Seller) shall be free from manufacturing defects in material and workmanship which are covered within the warranty period, subject to the disclaimers and limitations of the Agreement. This is not a warranty of performance, but a limited warranty as to the condition of the Goods at the beginning of the warranty period. The warranty period, measured from date of shipment by Seller, shall be: one year for hot runner systems and components (other than heaters and thermocouples); three years for defects causing leakage for DFQ bushes; three years for cast (pro-rated) and DF heaters; one year for sump pumps, fast cycle mold change products, six months for thermocouples; two years for temperature and valve gate controllers (reduced to six months for electronic components); one year for quick mold change products; and 90 days for all other Goods. The percentage of the replacement cost shall be reduced by three percent for each full month from 90 days after the date of shipment for the cast heater warranty and by 50% and 75% at the end of six and nine months, respectively, after shipment for the screen pac, fast cycle mold change and KK heaters. Because the Goods may be subject to a wide variety of use, installation, maintenance and cleaning, the warranty is only against such defects and not against any other failures such as, but not limited to, those due to wear and tear, and normal maintenance and perishable items are excluded from the scope of the warranty at

B. Seller warrants to Buyer that the Goods will be as described in the Agreement in all material respects, subject to the limitations stated herein and the Seller’s published and internal standards; however, Seller retains the right to change the dimensions, compositions, design, performance or color and appearance of the Goods. In its judgment, the change is non material. Seller may, in its discretion, also rely on any generally accepted industry standards.
10 Patent Express Warranties

Seller shall defend and indemnify Buyer from any claim which asserts that the Goods or their inherent methods of operation, intrinsically, infringe any United States patent, except as to a claim based on Buyer’s use of the Goods as a step in an overall process or as an element in an overall combination. Seller’s obligation shall not apply to a claim based on Goods or portions thereof specified, designed, or manufactured by Buyer. Buyer shall notify Seller promptly of any assertions of patent infringement and provide Seller with assistance and information requested by Seller, or Seller shall have no further obligation to defend or indemnify. Seller shall defend with its counsel or other counsel of its choice and shall have the sole right, without consultation with Buyer, to take all action Seller deems appropriate to prosecute or settle such claims. Seller’s exclusive obligation to defend and indemnify as to a claim as described above is limited to the acquisition of a license to the infringement of Goods with non-infringing modifications, the modification of the Goods so that they are non-infringing, or the return of the purchase price and shipping costs in exchange for the Goods, as Seller may elect. This section states the Seller’s entire and exclusive obligation regarding patent infringement.

11 Disclaimer and Limitation of Express Warranties

There are no express warranties other than those contained in the Agreement. Any representations as to performance and other matters, except as contained in the Agreement, were for illustrative purposes only and do not constitute a warranty whether or not the Goods are to be used exclusively by Buyer, there shall be no third party beneficiaries to the express warranties contained herein. Seller does not warrant any portion of the Goods that were not manufactured or furnished by Seller whether or not specified by Buyer, but Seller shall assign to Buyer upon request all assignable warranties of Seller’s suppliers related to such Goods. All descriptions, shipping specifications and illustrations of the Goods or the Seller are for quality and other systems and capabilities in catalogues, brochures and price lists or otherwise provided by the Seller are intended for general guidance only and the Seller is not responsible for any errors or omissions therein or for any loss or damage resulting from reliance on them. Seller shall not be responsible or liable for any Governmental agencies in the possession of any, provided by the Seller or its agents and contractors (including those provided under any duty to inspect the Goods for any defects or any improper use or modification of the Goods nor to correct or advise the Buyer of any such condition, use or modification, which is observed. Any notification which may be given is voluntary and subject to all limitations and disclaimers in the Agreement.

15 User’s Responsibility for Safety

It is Buyer’s or other user’s responsibility to provide all proper dies, devices, tools, training, and other means that may be necessary to effectively protect all personnel from serious bodily injury which otherwise may result from the method of particular installation, use, operation, or service of the Goods. Manuals furnished by Seller; ANSI Safety Standards; EPA, OSHA and similar state regulations; and other sources should be used by Buyer to ensure the safe use of the Goods. If Buyer fails to comply with the obligations set forth in this section, Buyer shall indemnify and save Seller harmless from any liability or obligation incurred by Seller to persons injured directly or indirectly in connection with the operation of the Goods and all warranties of Seller shall become automatically void.

16 Indemnification

Buyer shall indemnify the Seller from any and all third party claims, damages, and expenses (including reasonable attorney fees) under theories of tort, product liability, negligence (ordinary or gross), warranty, contract, statute, or otherwise arising out of the use, storage, sale, processing or other disposition of the Goods, supplies or materials used in connection with the Goods, or parts manufactured with the Goods, if the action or inaction of the Buyer or its employees, customers or agents, or the Buyer’s design specifications, were a material or proximate cause of injuries or damages giving rise to claims against the Seller.

17 Consequential, Incidental, and Other Damages

Buyer and Third Parties shall not be entitled to any consequential, punitive, exemplary, or incidental damages, as defined in the UCC or otherwise. This limitation shall be enforced regardless of whether Seller has defaulted in its warranty, or other obligation, or where Buyer or a third party to such Goods shall not affect the right of Seller to indemnification hereunder, and under no circumstance shall Buyer recover more than the purchase price.

19 Proprietary Information

A. Buyer acknowledges that any information disclosed to Buyer has not and will not be confidential or a trade secret unless clearly and conspicuously noted on the disclosure, or in some writing delivered to Buyer prior to the time of the disclosure. Otherwise, Seller shall be under no obligation to refrain from using in its business any information, manufacturing processes or unpatented disclosures which may pass to it from Buyer in the performance of the Agreement.

B. All proposals, plans and other information furnished by the Seller in bidding, negotiating and performing the Agreement, are confidential and the property of Seller and shall not be shown or disclosed to any other bidder, and shall not be shown or disclosed to any third party or used by Buyer except as may be necessary for the selection or use of the Goods.

20 United States Government Regulations

The Buyer shall not engage in any transaction with respect to the Goods which violates any statute or regulation of the United States of America.

21 Certifications

Seller certifies that any Goods produced in the United States shall be produced in compliance with the applicable requirements of Sections 6, 7 and 12 of the U.S. Fair Labor Standards Act, and of the regulations and orders of the U.S. Department of Labor issued under Section 14 thereof. No other certifications or wavers regarding payments to Seller’s suppliers or laborers are required.

22 Time for Bringing Action

Any proceeding by the Buyer for breach of the Agreement or any other right against Seller arising from in or connection with the payment cannot be filed nor maintained unless: (i) it is commenced within one (1) year after the cause for action has accrued; (ii) Buyer has given timely written notice to Seller of its claim as provided herein; and (iii) Buyer deposits the unpaid portion of the purchase price with the tribunal pending final adjudication. An action shall accrue no later than shipment of the Goods.
5.1 GLOBAL SERVICE CONTACTS

In case of problem or for any further information, please use the contact information below, or visit www.incoe.com.

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These products are covered under one or more of the following Patents: USA 5,269,677; 5,660,369; Canada 2,062,903; Germany 4028660; 4324275; Japan 2,093,613; and other foreign patents pending.
5.2 GLOBAL OFFICES

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