

PLATE DESIGN GUIDELINES FOR LSR MANIFOLD SYSTEM

HUSKY[®]

12107619-2

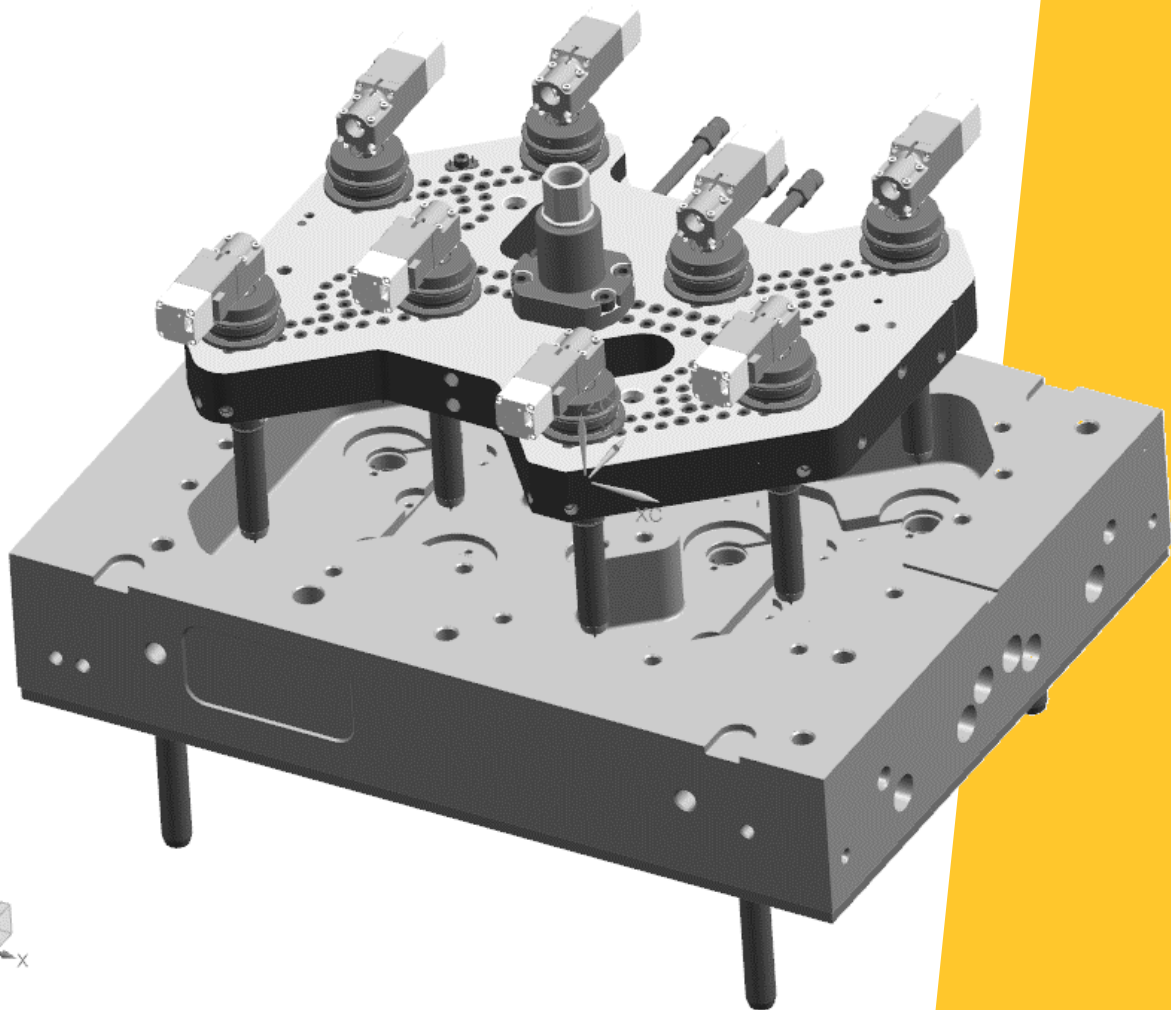
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How to use this guide

This guide is designed to help a mold maker integrate a Husky Cold-Manifold System into their plate and mold design. The guide is divided into three main sections:

- 1.) Terminology used with Husky Cold-Manifold Systems
- 2.) General recommendations
- 3.) Plate design steps including the addition of:
 - Guide-Pins and Cavity-Plate-Interface-Taps
 - Nozzle Bore, Cooling, Manifold-Pocket
 - Plate Bolts
 - Plate Alignment Dowels
 - Wire Channels
 - Pry Slots
 - Lift-Taps and Platen-Mounting
 - Nameplate



Design Package

The following design items are provided by Husky with all Cold-Manifold Systems
3D Models

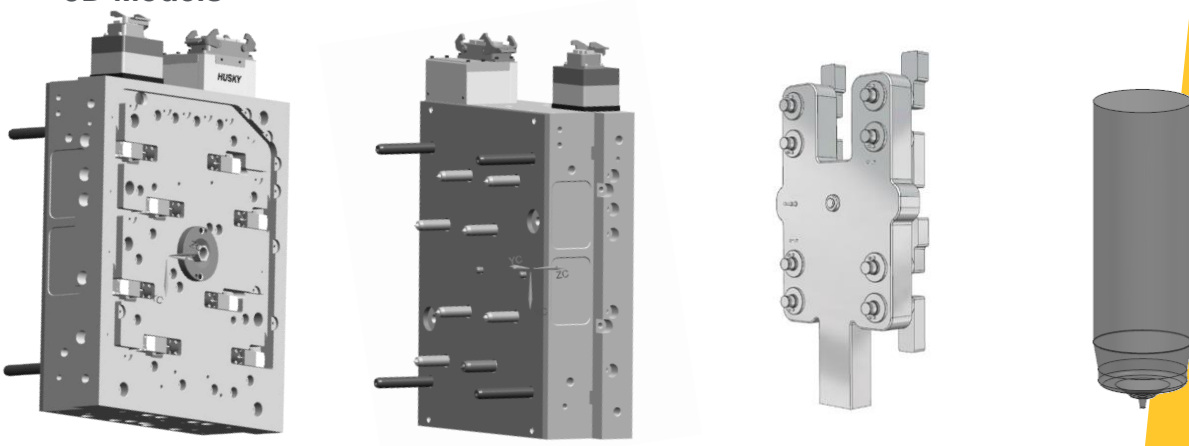
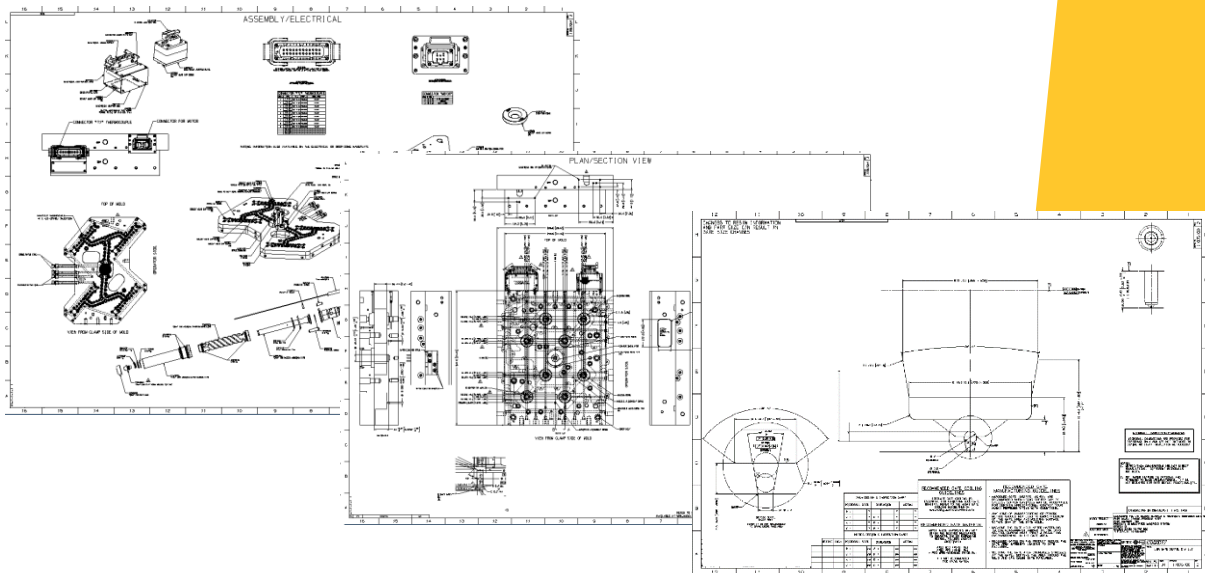


Plate Assembly

Manifold Pocket Inverse Gate Detail

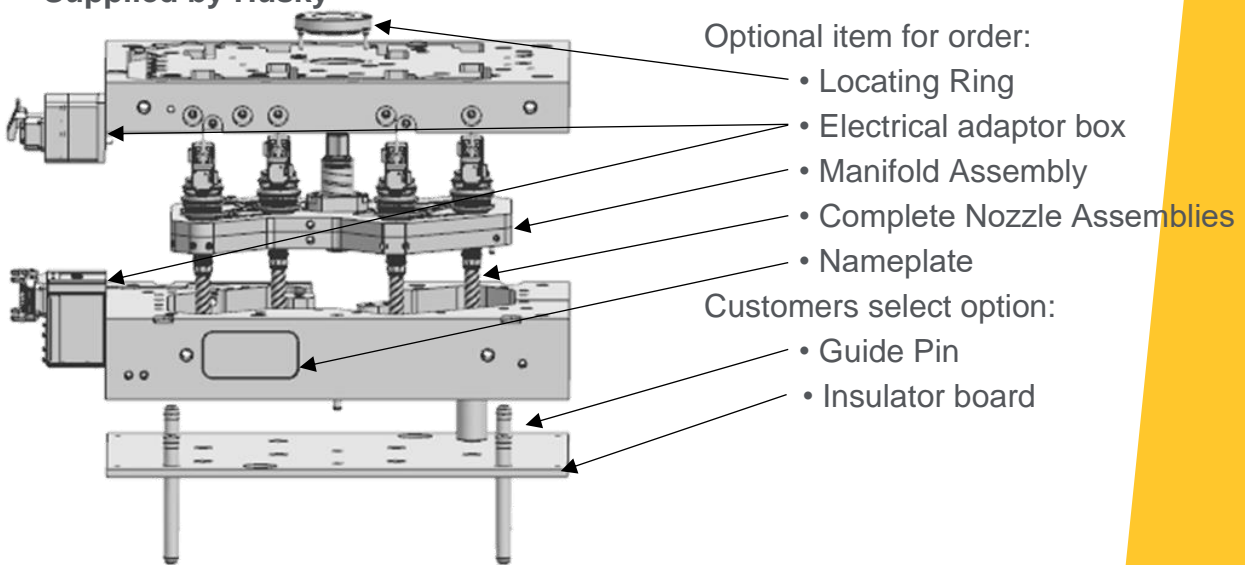
2D Print Package



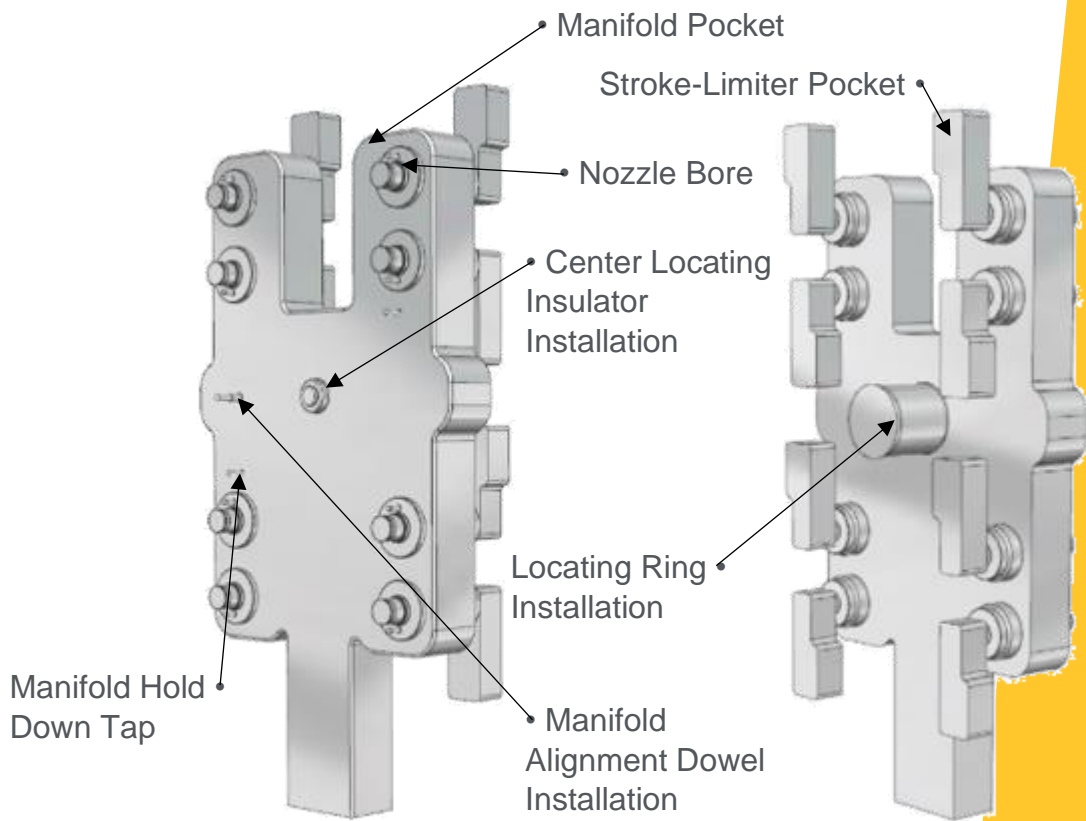
- Plate Installations
- Assembly Electrical
- Gate Detail

Nomenclature

Supplied by Husky



3D Pocket Geometry



General Recommendations

Plate Steel

Stainless steel is the recommended material for plate manufacture.

Recommended plate material properties:

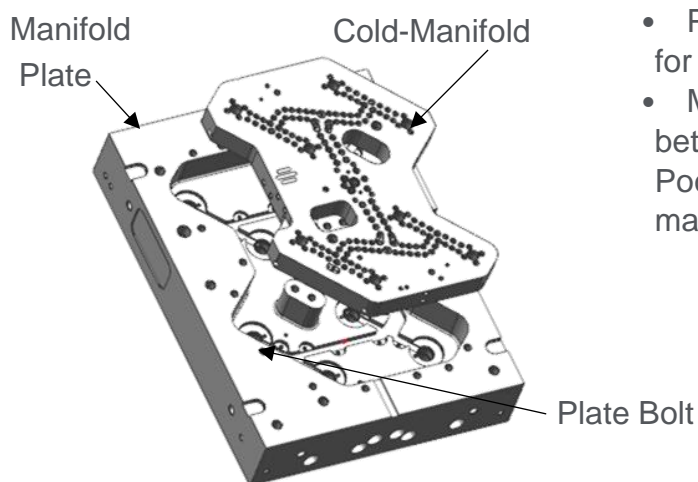
- Minimum Yield Strength 640 Mpa
- Hardness 24-36 HRC

Examples of suitable steel types are listed below:

Type	Hardness (HRC)
AISI 4140	30-35 HRC
AISI P20	30-35 HRC
AISI 420	30-35 HRC
DIN 1.2316	30-35 HRC

Manifold Pocket

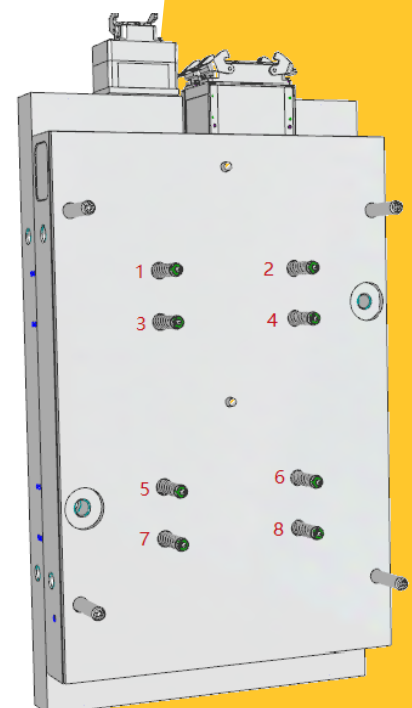
Husky recommends machining a pocket into the Manifold-Plate for the Cold Manifold. The 3D model provided by Husky includes all necessary geometry. A pocket profiled to match the Manifold:



- Provides superior structural support for the mold and cavities.
- Maintains a consistent air gap between the Manifold and Manifold-Pocket to thermally insulate the manifold from the surrounding plates

Cavity Numbering

Clear nozzle identification is necessary to ensure the Cold-Deck properly interfaces with the mold and that the Nozzle-Thermocouples are mapped correctly.



Insulator Board Specification

Recommended Insulator Board properties if not supplied from Husky:

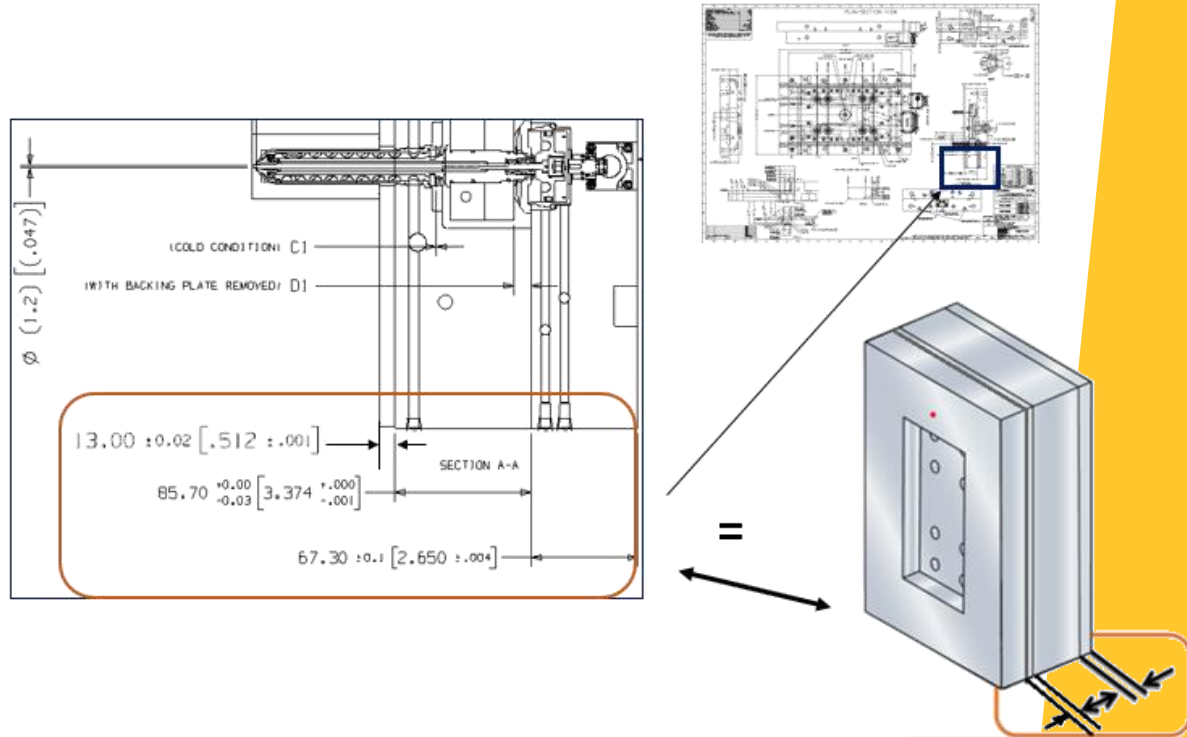
Technical Data :

Max. service temperature		
• long-term	250	°C
• short-term	280	°C
Compressive strength*		
• at ambient temperature	750	N/mm ²
• at 200 °C	500	N/mm ²
Coefficient of thermal conductivity		
• at ambient temperature	0.25	W/mK
• at 200 °C	0.35	W/mK
Linear coefficient		
X- and Y-direction	11·10 ⁻⁶	1/K
Z-direction	60·10 ⁻⁶	
Flexural strength		
• at ambient temperature	500	N/mm ²
• at 200 °C	300	N/mm ²
Density	2	g/cm ³

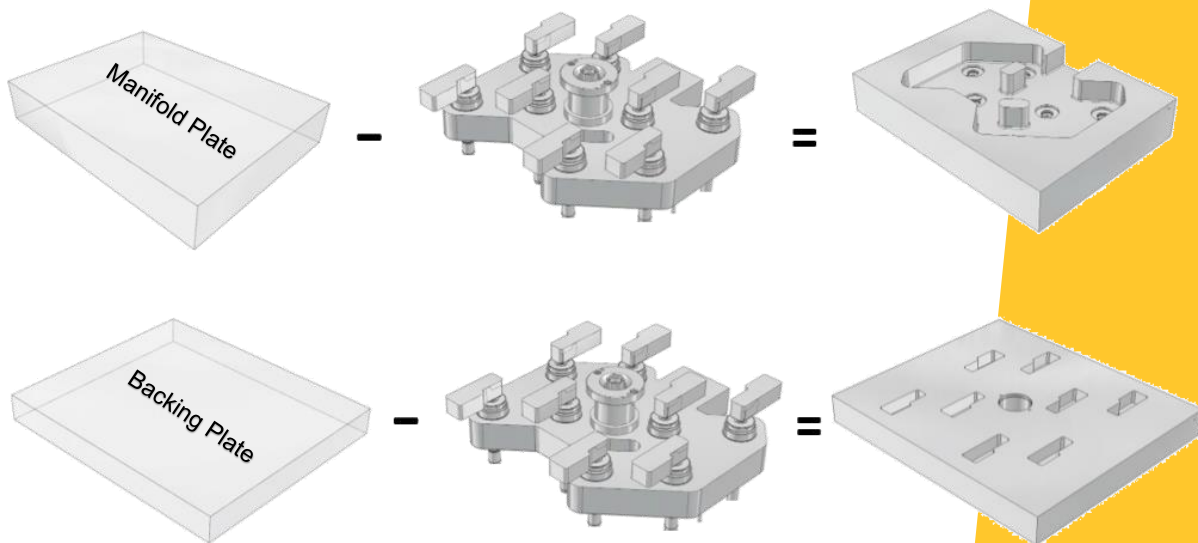
* Compressive stress at break. The possible specific compressive strength depends on the particular application

Installing Manifold Pocket in Plates

Step 1 – Adjust Plate Thicknesses

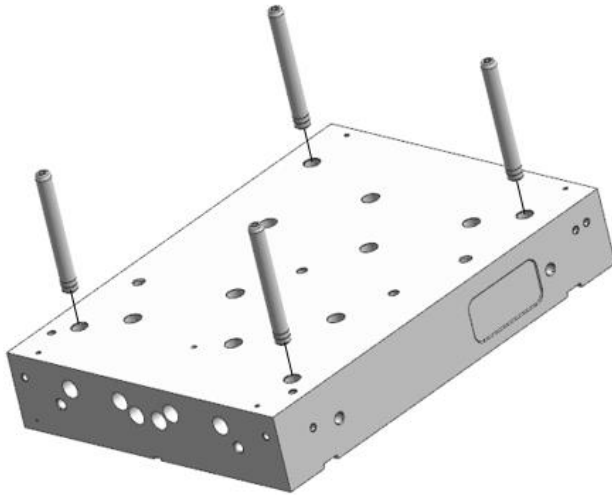


Step 2 – Subtract Pocket Inverse from Plates



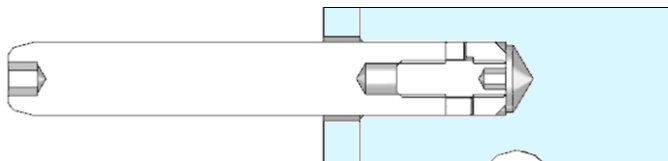
Mold Interfaces

Step 1 – Add Guide Pin Installations



Guide-Pins align the Cold-Deck Manifold-Plate to the Cavity-Plate and protect Nozzle-Tips during lifting and handling (if Cold Deck built “hot half” style). Husky recommends Guide-Pin protrusion greater than or equal to 5mm [0.19”] longer than the nozzle length in order to protect the tips.

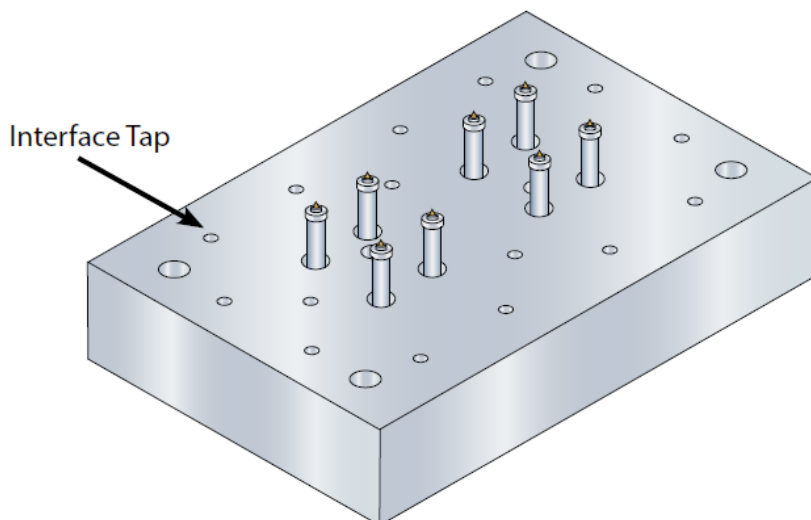
Guide-Pins should be removed after the system has been assembled. In case the Guide-Pins are not removed, additional clearance needs to be provided around the Guide-Pin.



Husky recommends clamp side alignment for Guide-Pins

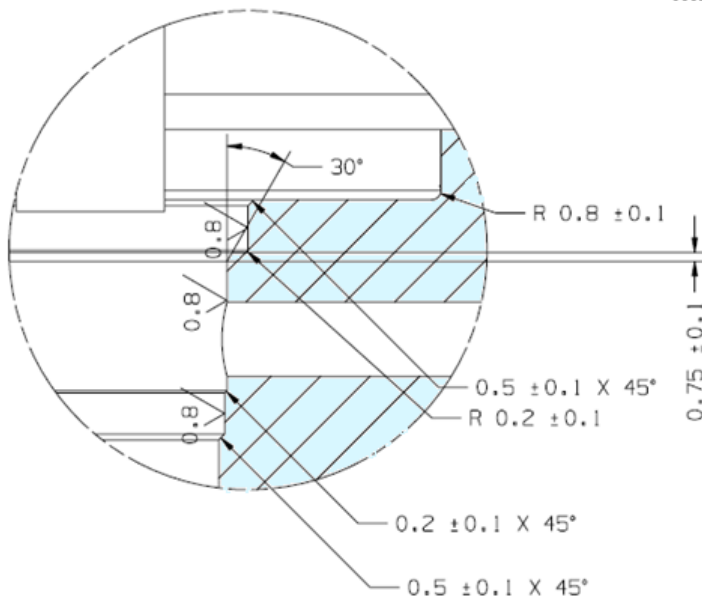
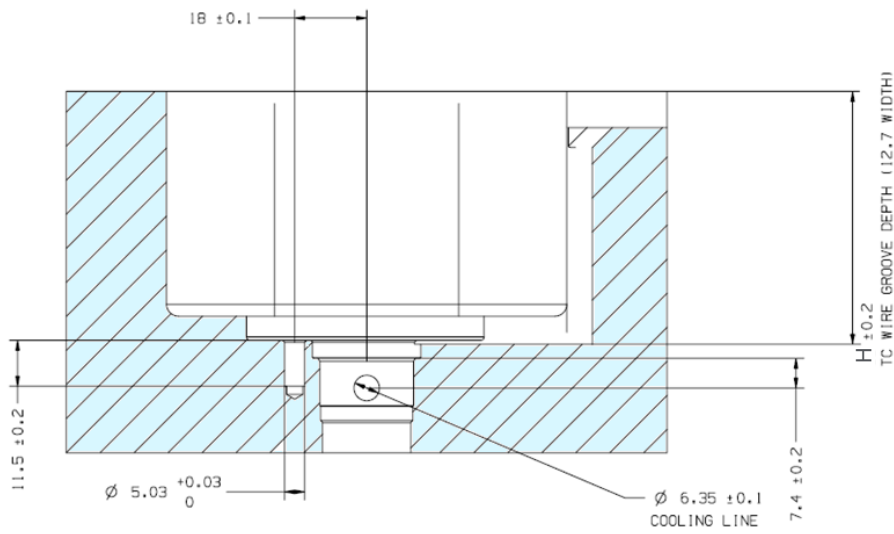
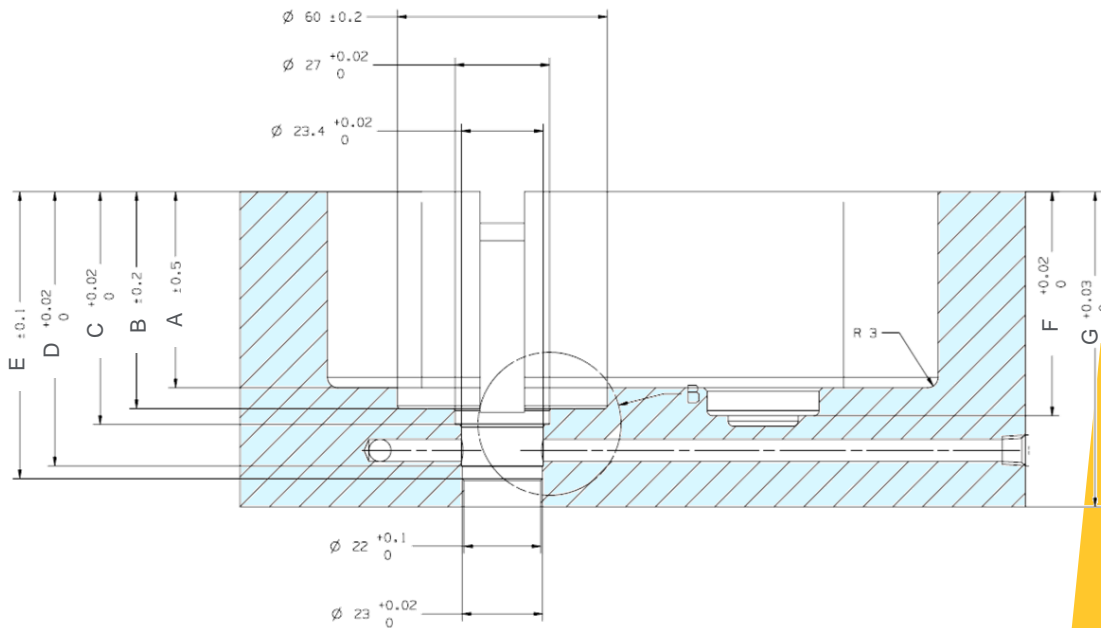
Step 2- Add Cavity Plate Interface Taps

Interface taps secure the Cavity-Plate to the Cold-Deck-Manifold-Plate



Nozzle bore, Cooling and Pocket Details

For A-B-C-D-E-F-G-H nominal value refer to 3D.



Bolting

Bolting will keep plates flat to maintain sealing between components in production condition with the machine force applied.

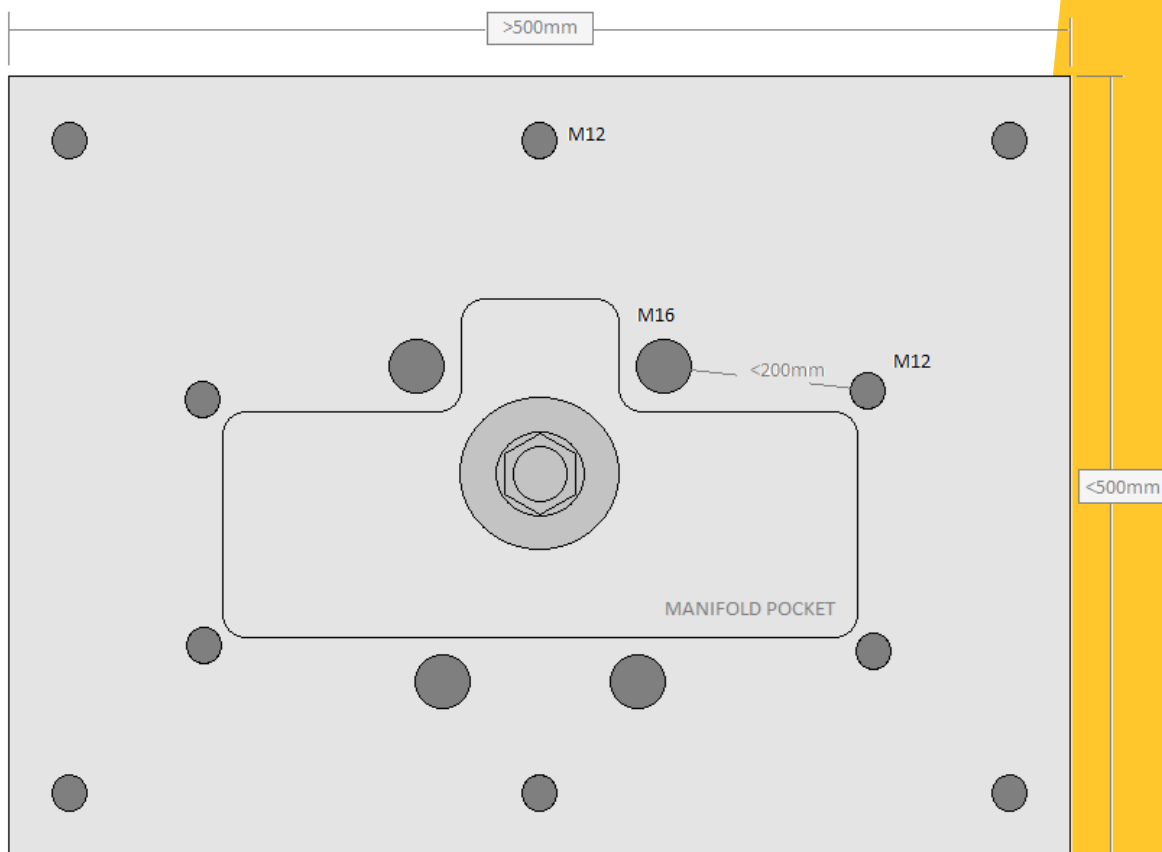
Perimeter bolting:

Place one M12 (1/2"-13) bolt per corner and add bolt in between if plate size is longer than 500mm.

Pocket Bolting:

Place 4x M16 bolts around sprue bushing to handle carriage force and add M12 along the pocket to fill larger than 200mm gaps with no bolts.

Example:



Cold-Deck Plate Alignment

The alignment dowel provides precise alignment between the Manifold-Plate and the Backing-Plate. In doing so, the following are maintained:

- Clearance fit between the sprue bushing and locating ring.
- Alignment between the sprue bushing and the machine nozzle (via the locating ring).
- In Valve Gate systems, alignment between valve gate piston cylinders and their installation in the Backing-Plate.

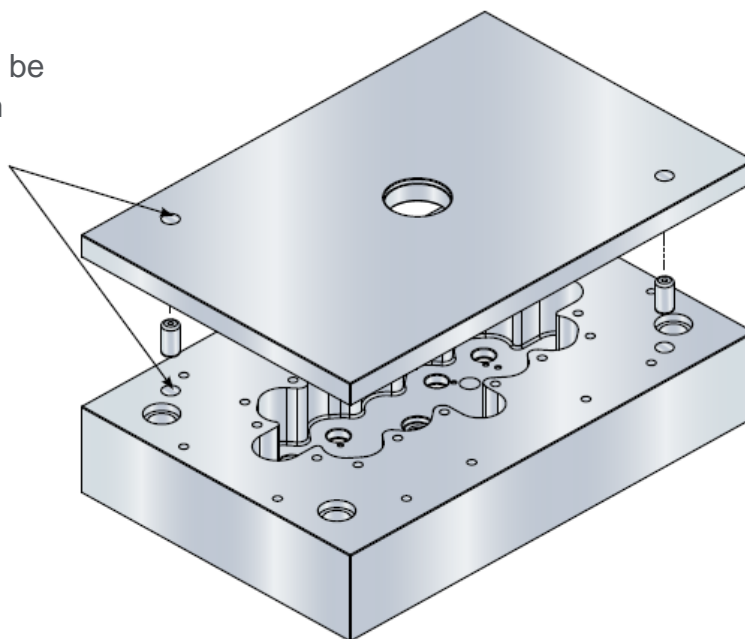
Step 1 – Add dowel installation to Manifold-Plate

Husky recommends press fit installation in Manifold-Plate

Step 2- Add dowel installation to Backing-Plate

Husky recommends locational fit installation in Backing-Plate

Alignment must be within 0.010mm [0.0005in] Total Indicator

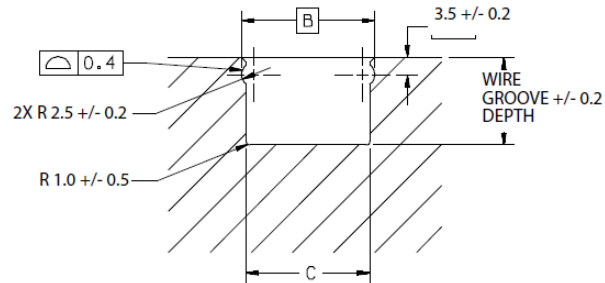


Wiring

Step 5a - Add Wire Clip Installations (if using Wire Clamps see Step 5b)

Note: Wire clips are available from Husky

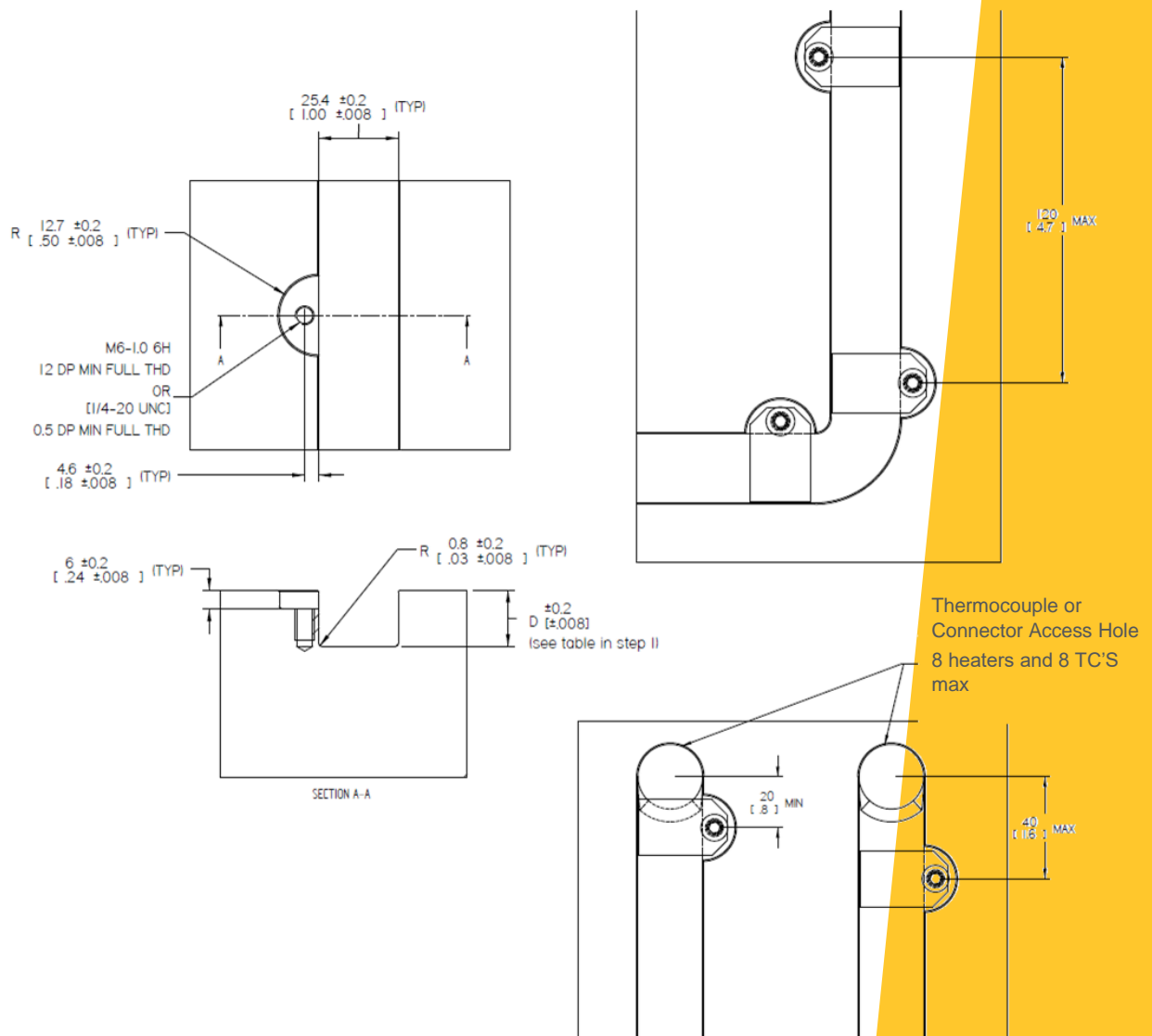
B	C +/-0.2
14.7	12.7
21.1	19.05
27.4	25.4
40.1	38.1



Step 5b - Add Wire Clamp Installations (if using Wire Clips see Step 5a)

Clamps should be positioned as close to the nozzle as possible and at every bend and/or interval of 120mm [4.7"]

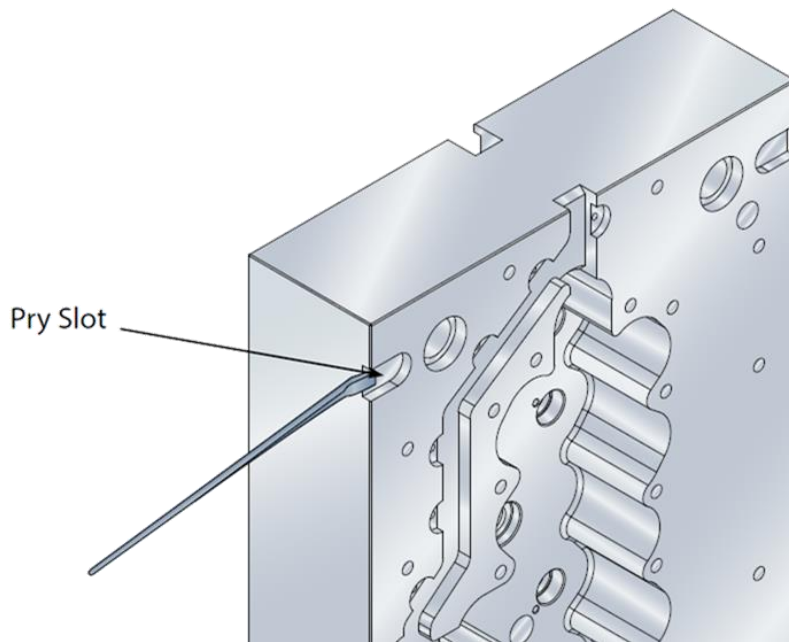
Wire clamps for 25.4mm [1.0"] wire groves are available for Husky Cold-Manifold-Systems



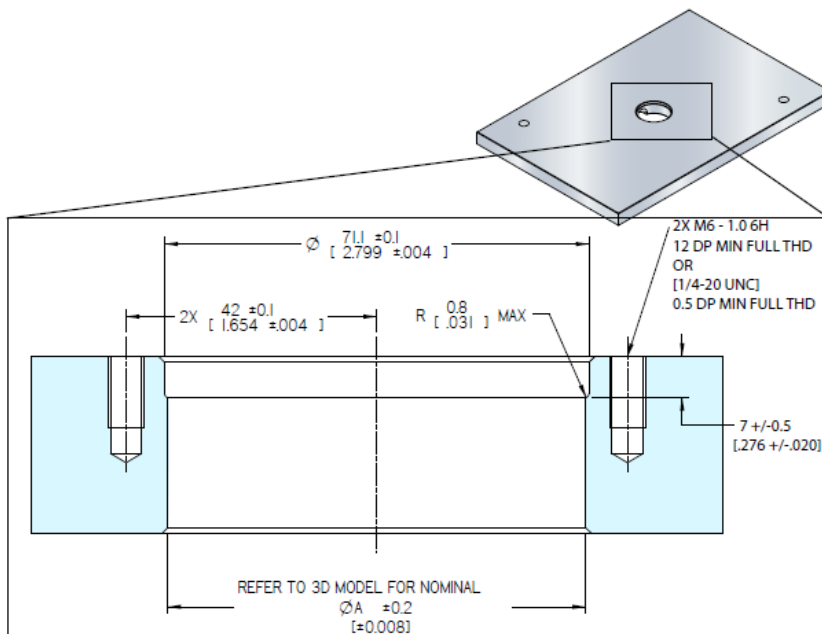
Pry Slots

Step 1 – Add Pry Slots

Pry slots allow easier separation of the plates. Position pry slots between all plate interfaces, near plate alignment features (Guide-Pins, Alignment-Dowels)



Locating Ring Installation



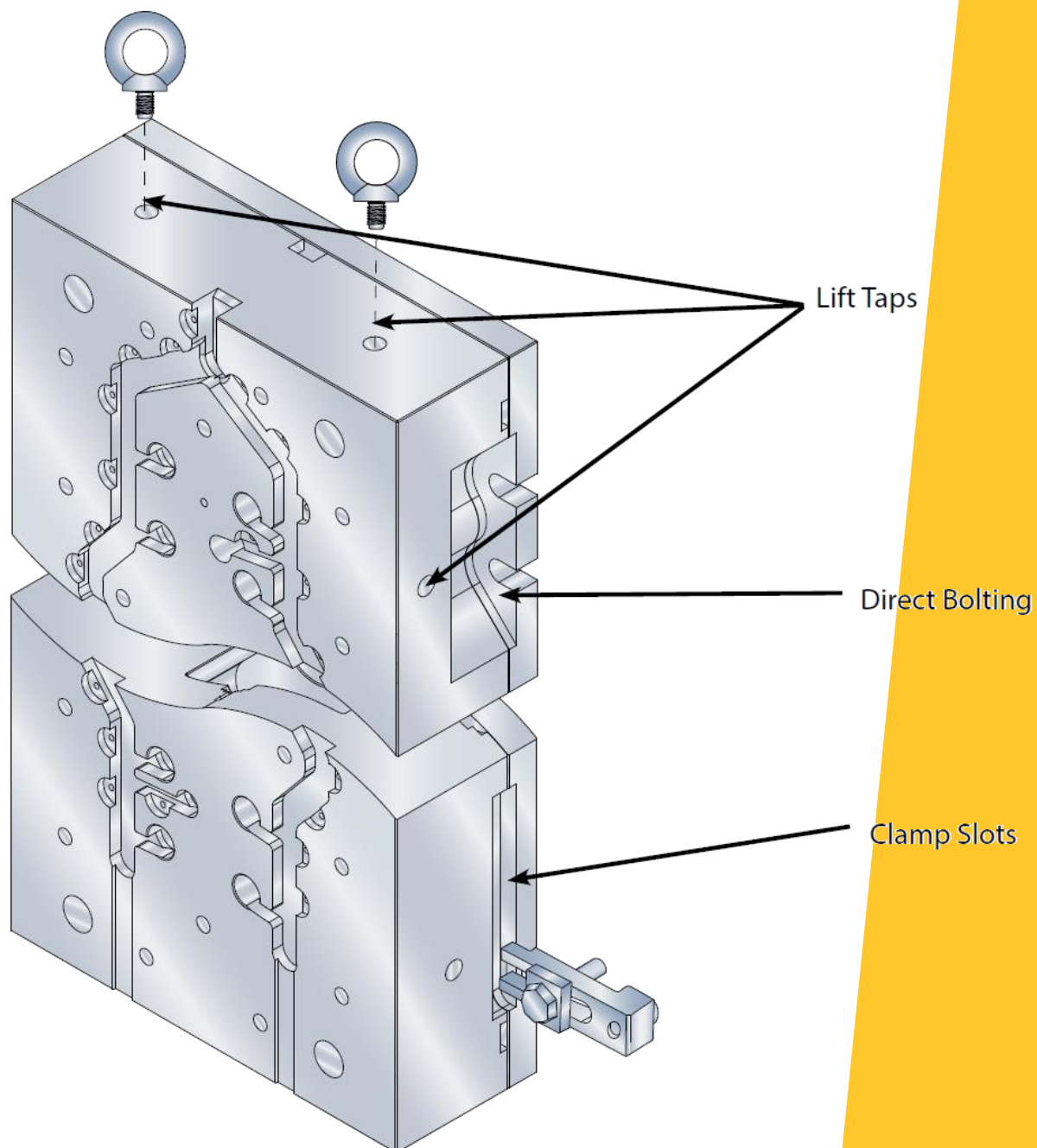
Lift Taps and Platen Mounting

Step 1 – Add Lift Taps

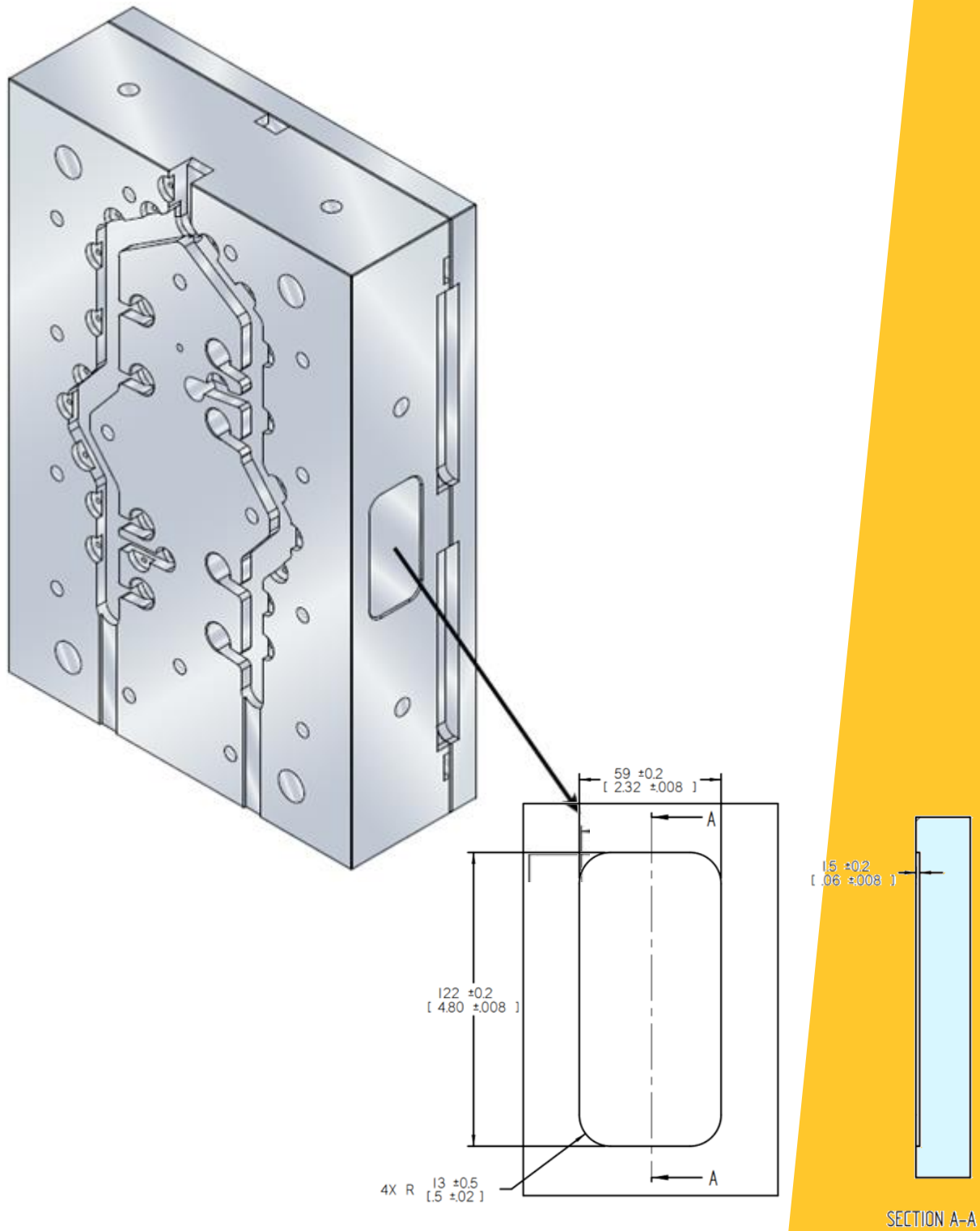
Add sufficient lift taps for handling individual plates as well as the assembly.

Step 2 – Add Platen Mounting

Platen mounting can either be clamp slots or direct bolting through an overhanging Backing-Plate or cutouts.



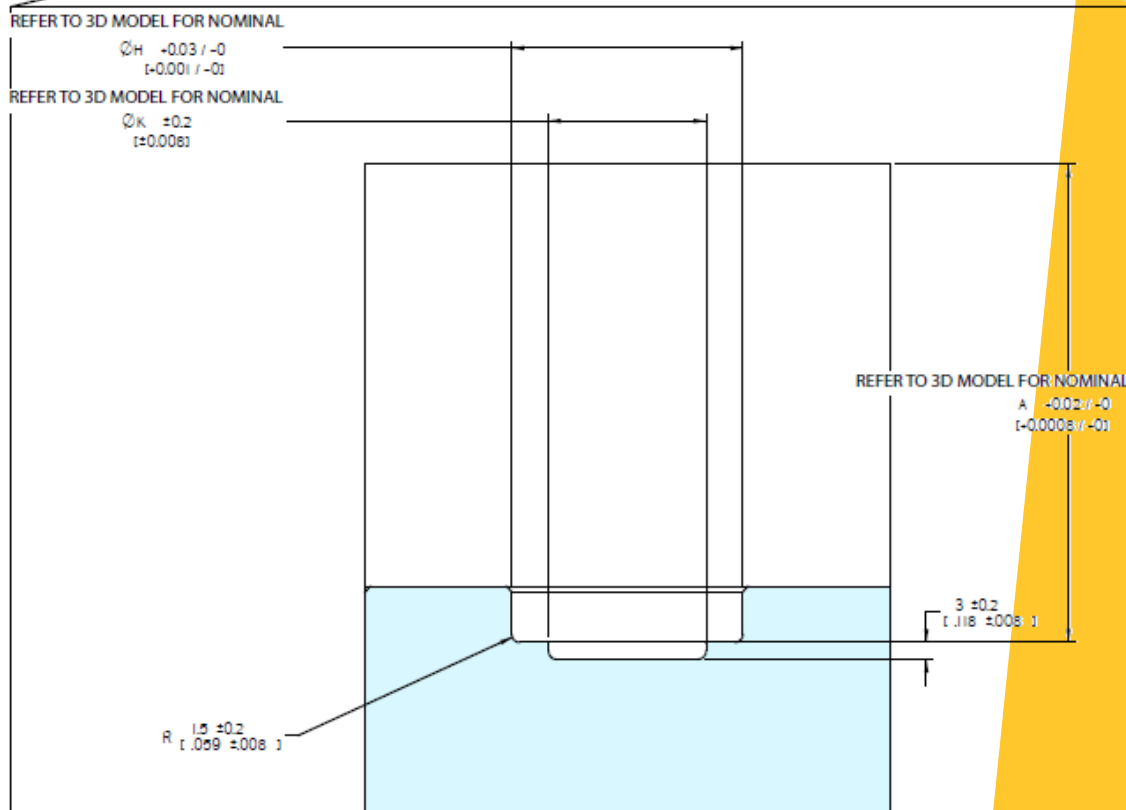
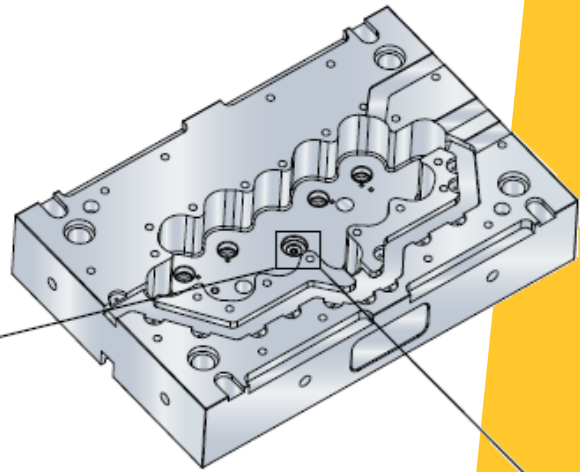
Nameplate Installation



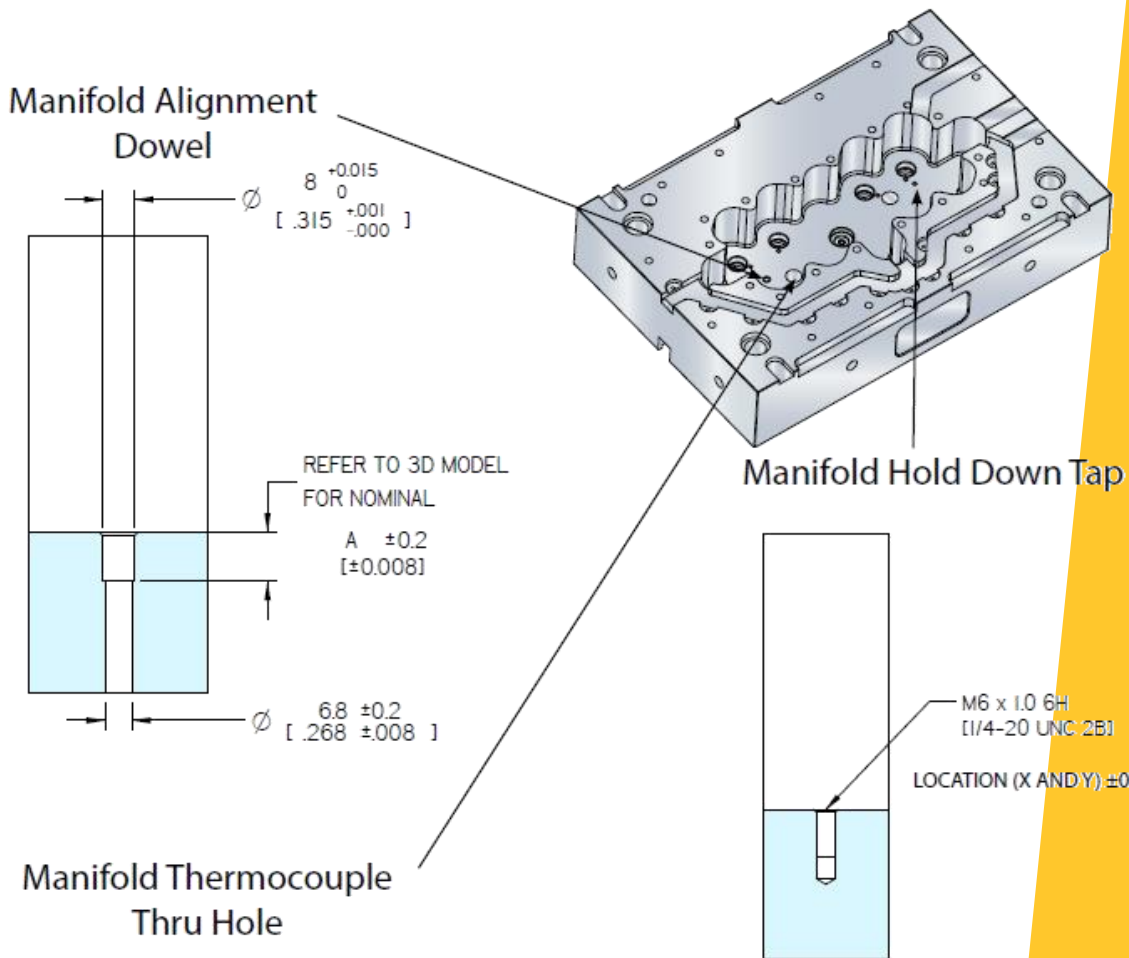
Tolerance Reference

Refer to 3D model for complete geometry

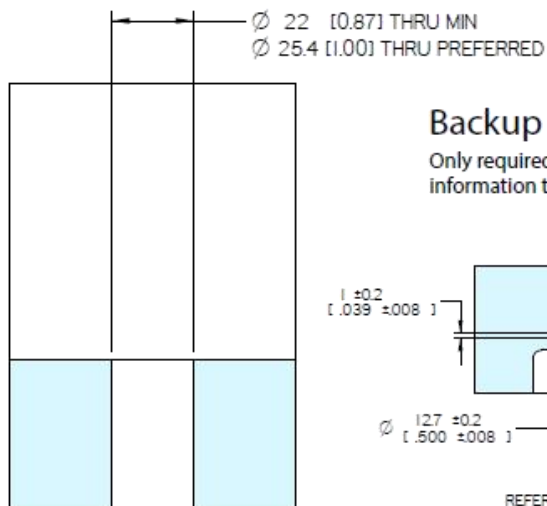
Center Locating Insulator



Other installations

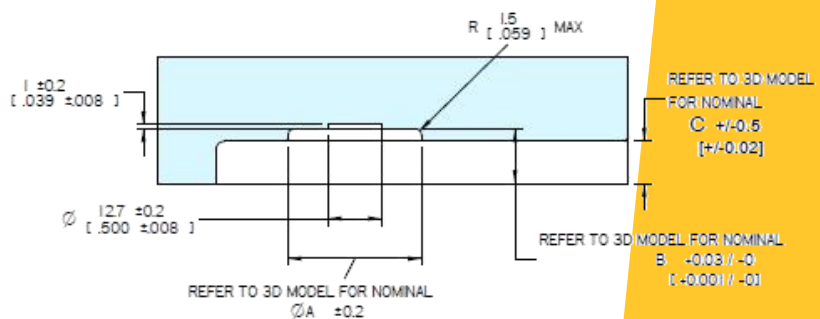


Manifold Thermocouple Thru Hole



Backup Pad Installation

Only required on select designs – refer to 3D model sent with project information to determine if required

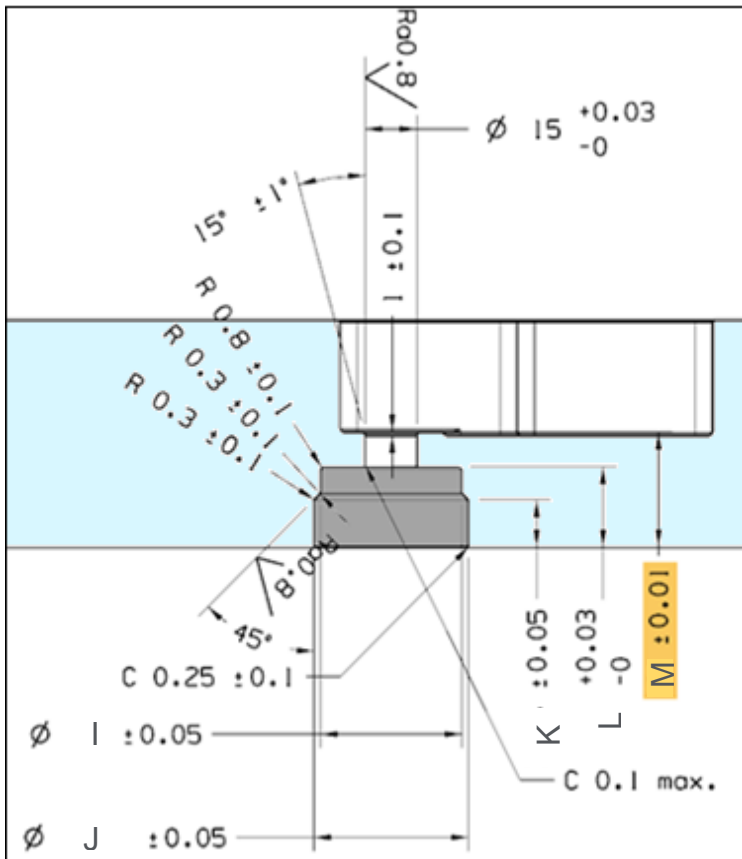


Electrical Stroke Limiter installation

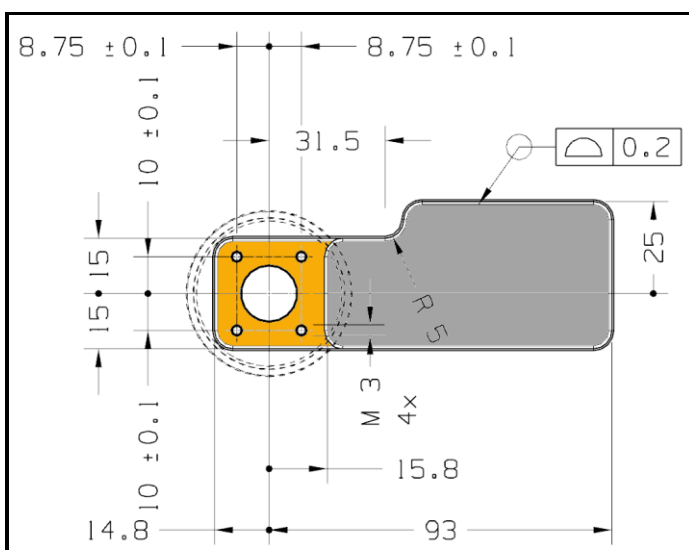
Find location of these installations in the assembly plan view.

For I-J-K-L-M nominal value refer to 3D.

Cylinder Installation:



Stroke Limiter Pocket:



Orange surface level according to the orange highlighted dimension on the "Cylinder Installation"

Gray surface to be 1mm deeper.

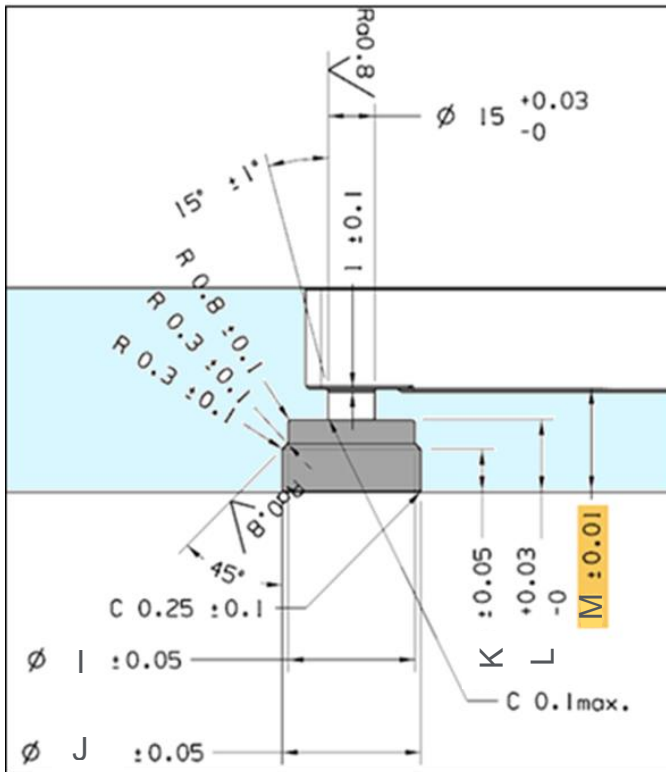
Floor Radius to be 0.8mm

Mechanical Stroke Limiter installation

Find location of these installations in the assembly plan view.

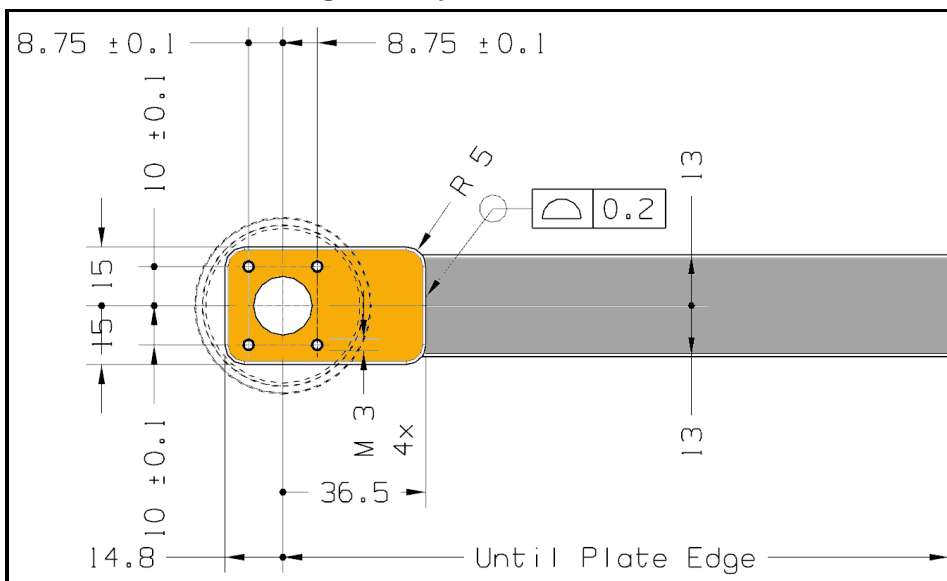
For I-J-K-L-M nominal value refer to 3D.

Cylinder Installation:



Stroke Limiter Pocket:

Refer to the full of the geometry from the 3D.



Orange surface level according to the orange highlighted dimension on the "Cylinder Installation"

Gray surface to be 1mm deeper.

Floor Radius to be 0.8mm

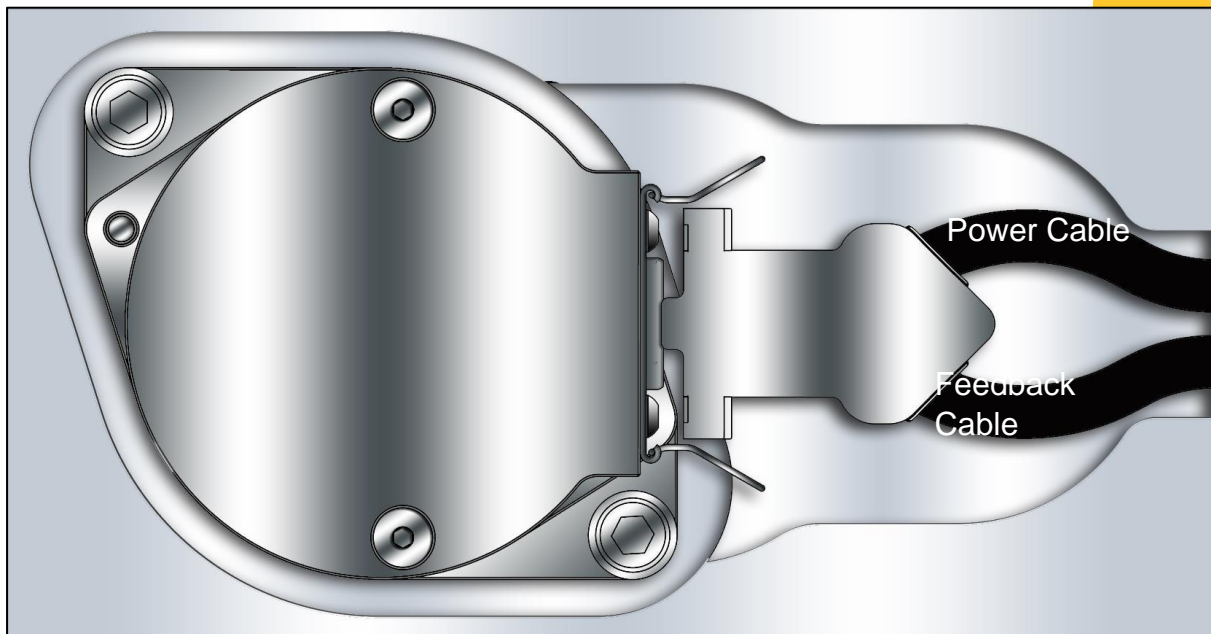
ISVG Specific Requirements

Wire Grooves

Each actuator has two cables exiting from it, one for power and one for feedback. These cables are cut to length and terminate in the electrical adapter box.

Power cable: 4.9mm OD nominal – Area 18.8mm²

Feedback cable: 6.5mm OD nominal – Area 33.2mm²



Wire groove depth:

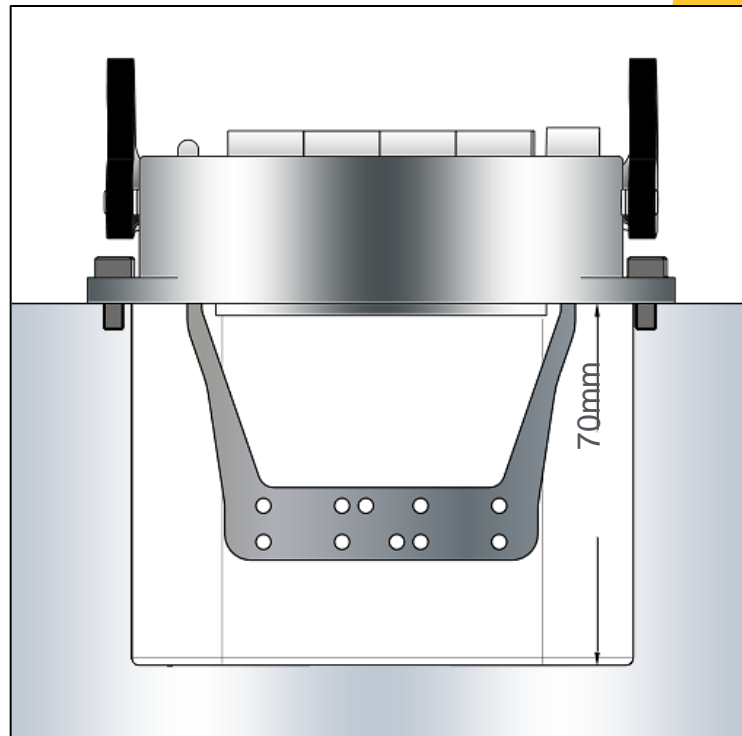
Drop Count*	Recommended Groove Depth	Drop Count*	Recommended Groove Depth
1	9	5	33
2	15	6	40
3	21	7	46
4	27	8	52

*Drop Count: number of drops that share a single wire groove

Electrical connector & box requirements:

It is recommended that the actuator power and feedback cables are routed to the backing plate adapter box, while the manifold, sprue, nozzle heaters and T/C's are routed to the manifold plate adapter box.

The power connector for the ISVG actuators utilizes a ground bar for attaching ground wires from the actuators. This ground bar protrudes from the underside of the connector so care must be taken when designing connector layout. If the connectors are directly mounted on the backing plate, a minimum pocket depth of 70mm is recommended to accommodate the ground bar and associated wiring.



If an electrical adapter plate is used for the actuator connectors, it must be at least 75mm (or 3") thick. Thinner adapter plates should be avoided as they do not provide adequate clearance between the ground bar and backing plate.

Questions?

Contact your Husky Project Engineer or the general inquiry numbers below

Americas Vermont - Tel. (802) 859 8000

Brazil São Paulo - Tel. (55) 11 4589 7200

Europe Luxembourg - Tel. (352) 52 11 51

Asia China – Tel. (86) 21 3850 8000