

Cylix Hybrid Actuation Technical Guide

Pneumatic/Hydraulic
HVB Backplate Mounted

Assembly Overview

IMPORTANT!!**Pneumatic Requirements**

Air quality: Filtered to 40 µM and lubricated

Minimum air: pressure 4 Bar

Recommended air: pressure 6-8 Bar

Hydraulic Requirements

Maximum Hydraulic: 100 bar

Oil Type: Mineral or Synthetic

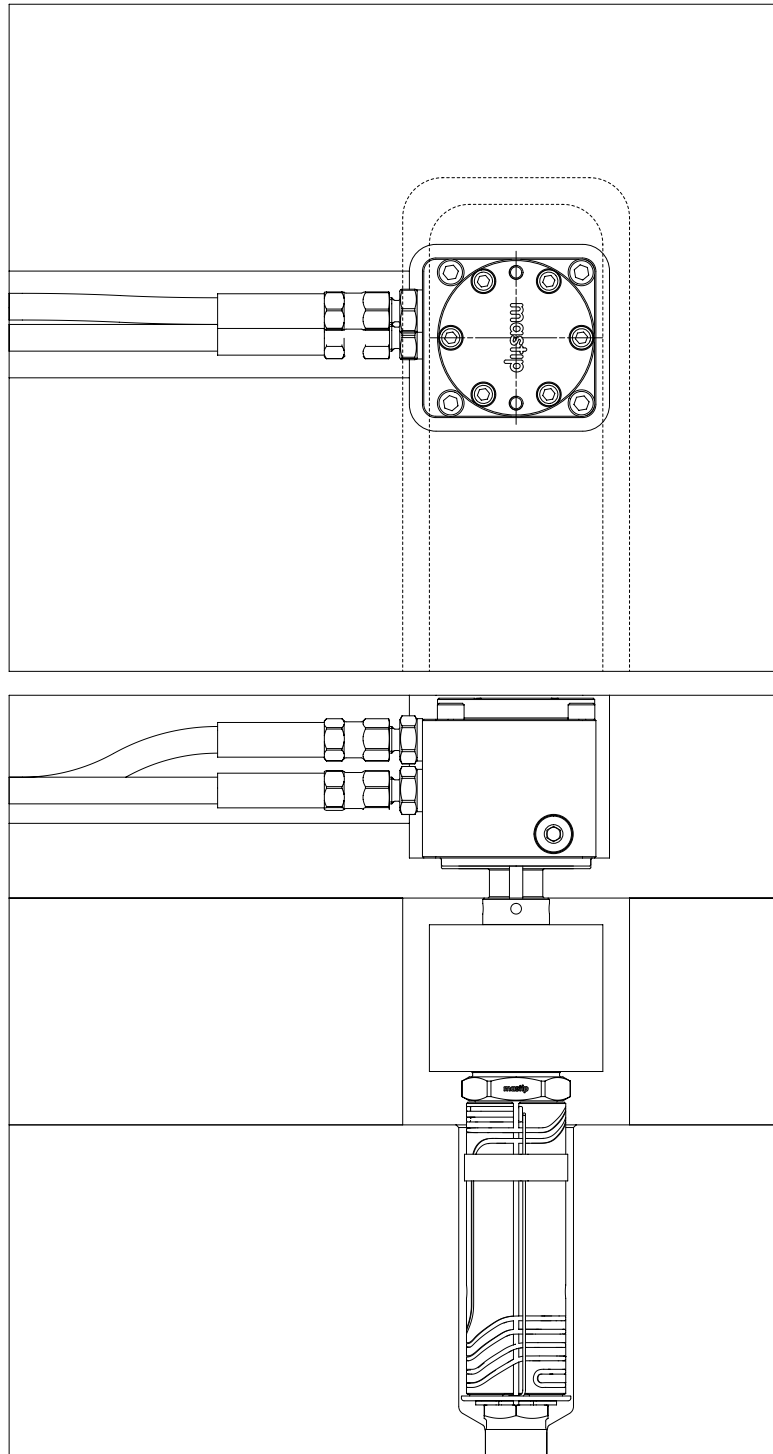
The HVB Cylix Actuators can be bolted directly into the backplate of the mould. In this situation, the backplate cooling may be sufficient to cool the actuator, and the cylix cooling channels may not be required to be connected. Sufficient cooling channels should be incorporated into the tool design.

For actuators without limit sensors the actuator must not exceed 150°C. Where limit sensors are used either the backplate must not exceed 50°C, or the cooling channels on the actuators must be used and supplied with cooling water below 50°C.

Pin Diameter

Pin diameter must be taken into account when setting hydraulic pressure to reduce risk of damage. A smaller pin diameter requires less pressure to close. Mastip recommends operating with minimum hydraulic pressure to close the pin and achieve cycle requirements.

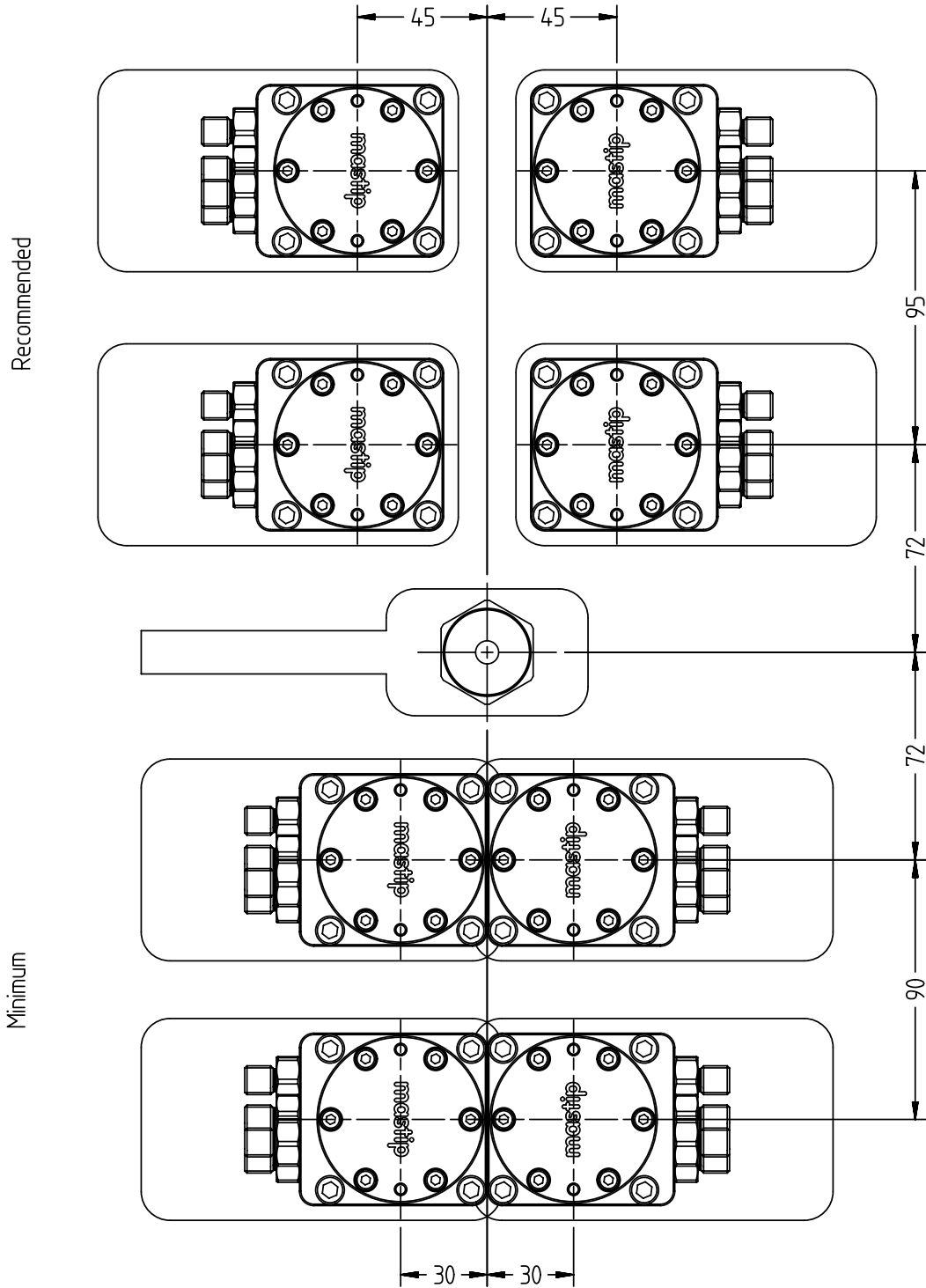
Assembly Overview



Key Features

- Conical (1) or Cylindrical (2) shut off
- $\varnothing 2.0\text{mm}$, $\varnothing 2.5\text{mm}$, $\varnothing 3.0\text{mm}$ and $\varnothing 5.0\text{mm}$ pin
- Pneumatic or Hydraulic actuation

Minimum Spacing Layout

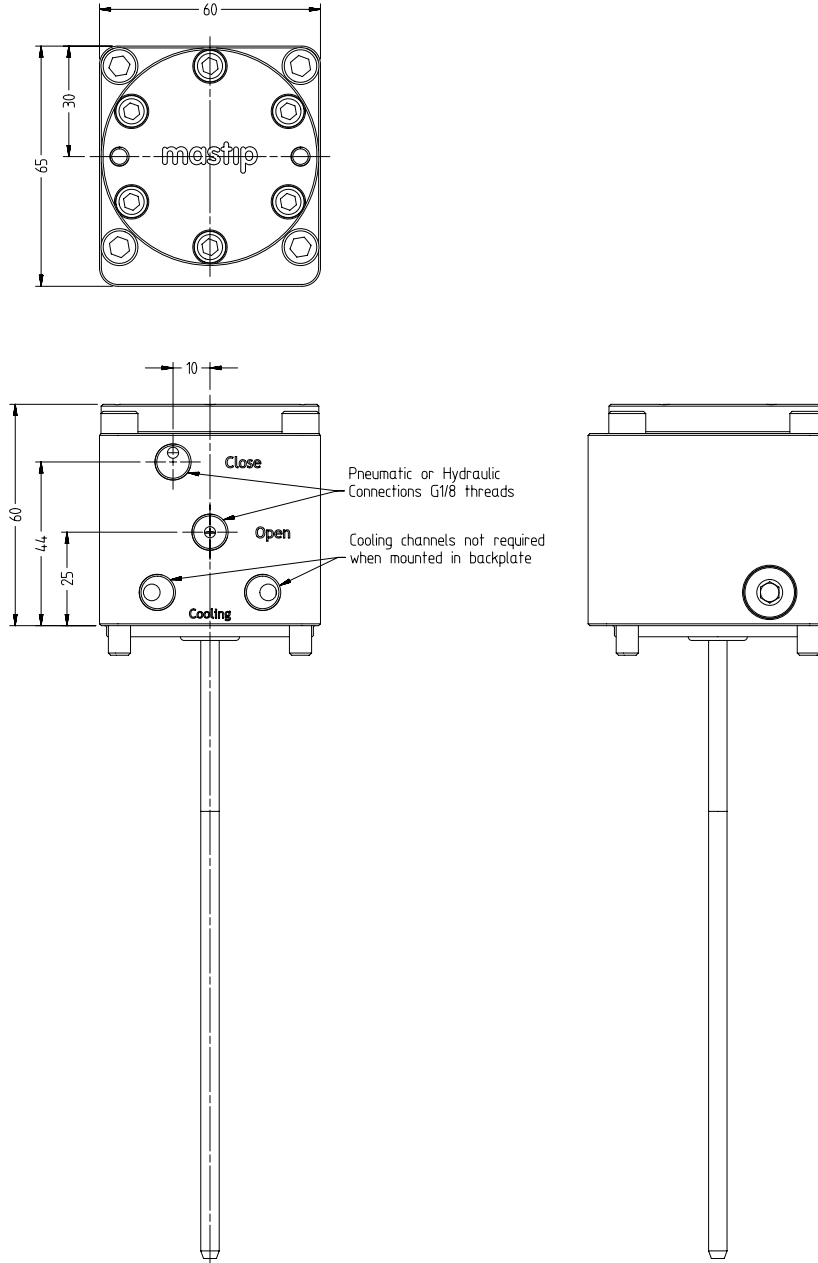


Cylx Actuation Overall Dimensions

Note: Pins are supplied in standard length and must be cut to required length before installation.

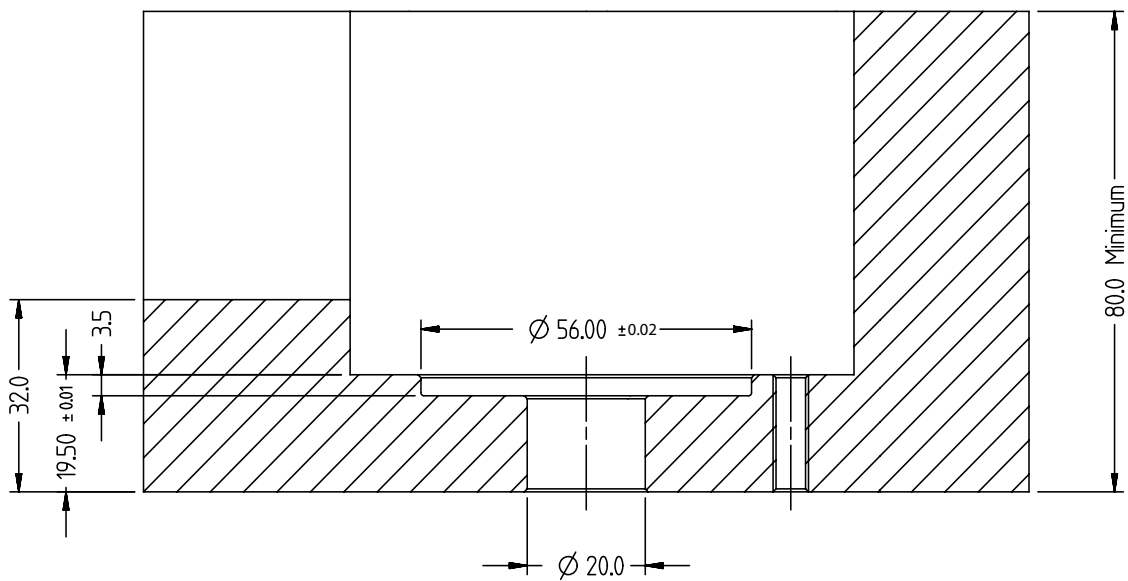
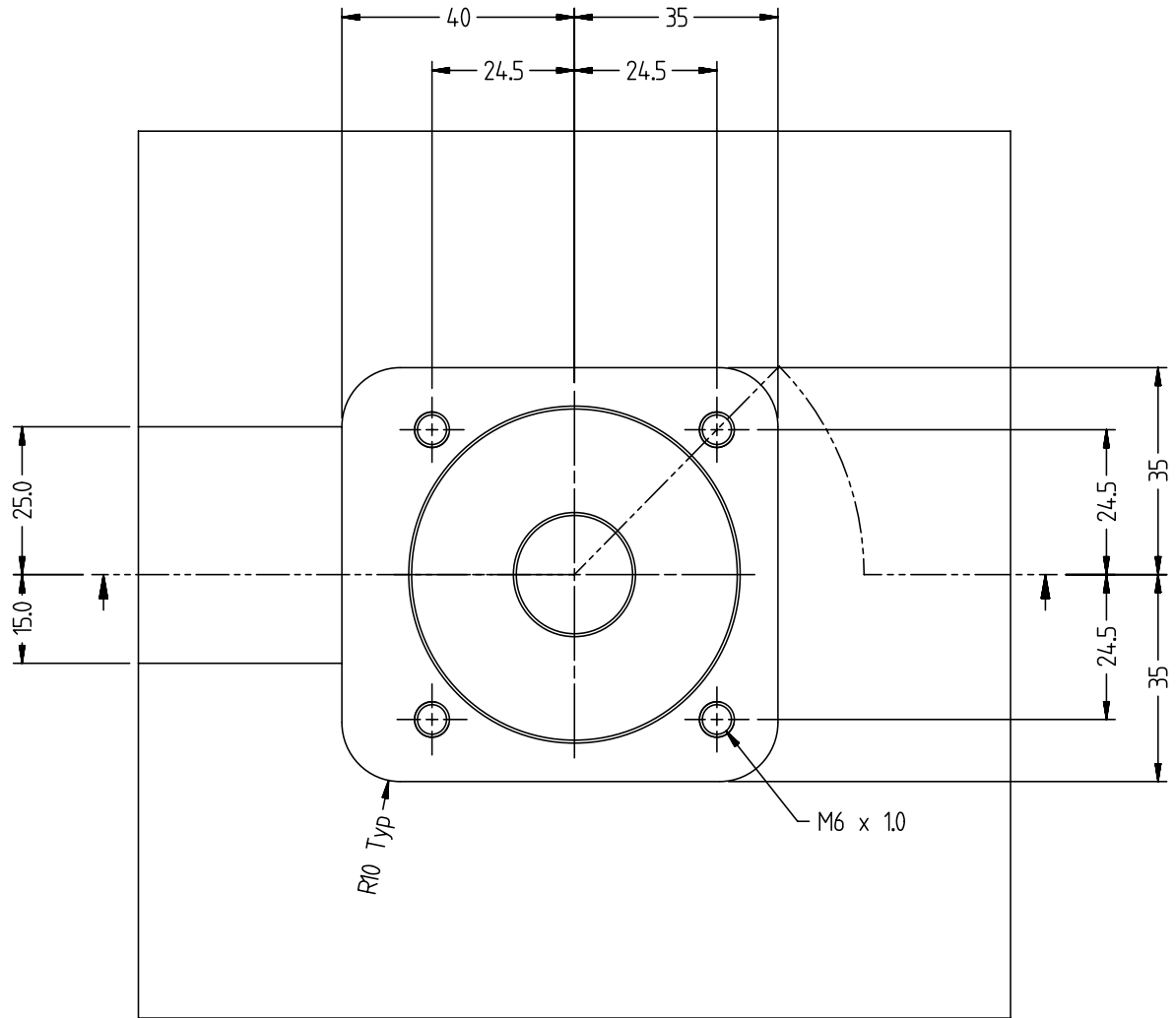
Pins can be supplied by Mastip finished ready to use

→ Refer to page HVB40-8 Pin Calculations section to calculate required final pin lengths



Nozzle Compability		
Description	Nozzle	Supplied Pin Size
HVB40-P1 Headed Pin	MX13 / BX13	Ø2.0
	MX16 / BX16 / TX16	Ø2.5
	MX19 / BX19 / TX19	Ø3.0
	BX27 / TX27	Ø5.0

Plate Details - Straight Exit



Pin Details

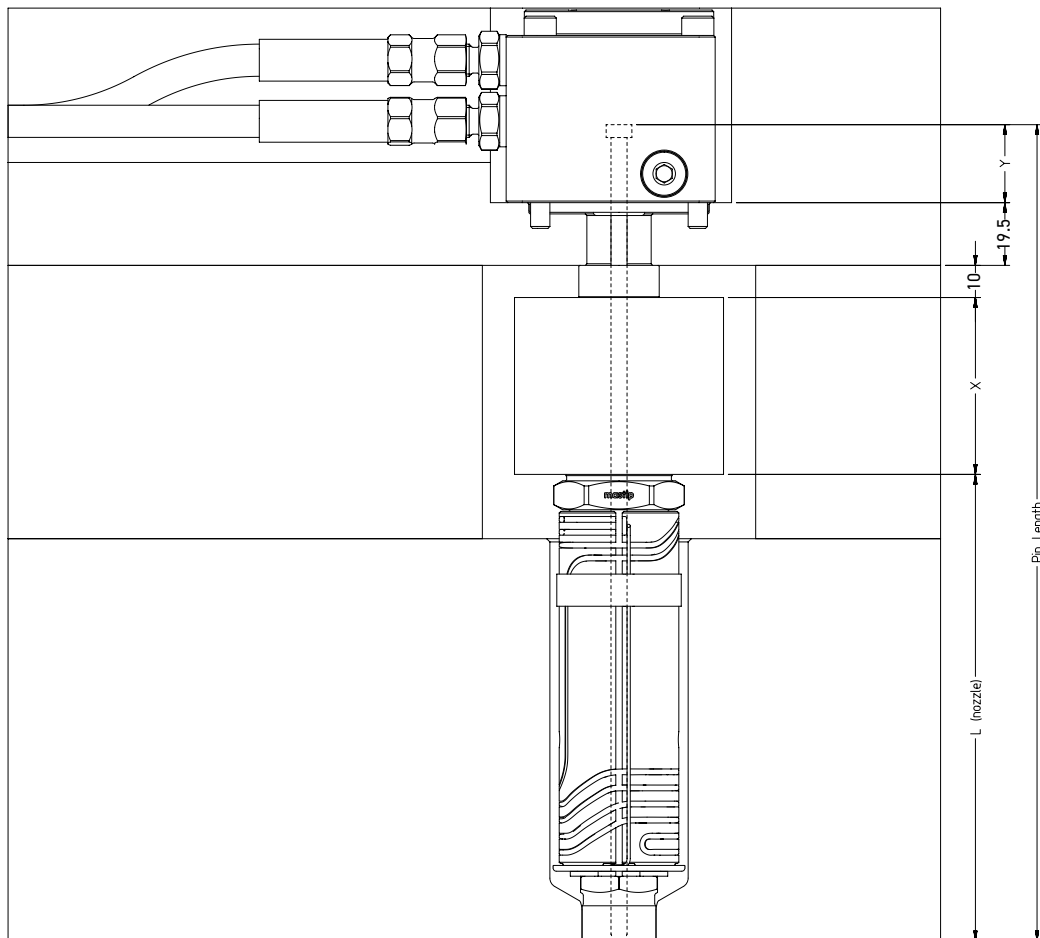
To calculate final pin length, use the following equation:

HVB40-P1 - D2.0
HVB40-P1 - D2.5
HVB40-P1 - D3.0

$$\text{Pin Length} = (Y=28.75) + 10.0 + X + L + 0.1 + 19.5$$

HVB40-P1 - D5.0

$$\text{Pin Length} = (Y=29.00) + 10.0 + X + L + 0.1 + 19.5$$



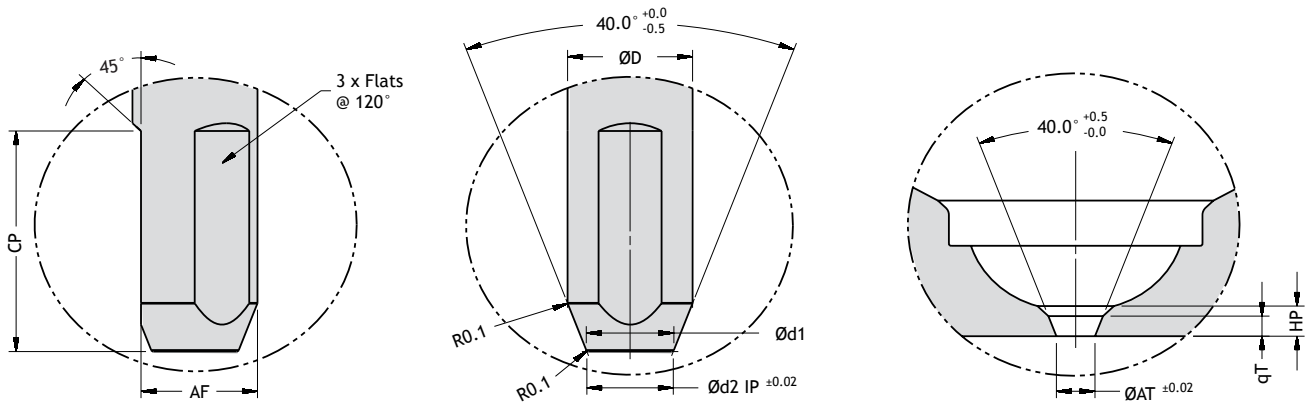
Conical and Cylindrical Valve Gate Recommendations

	Conical Valve Gate	Cylindrical Valve Gate	Key	Value
Gate Quality	***	***	*	Lowest Rating
Pin Cooling	***	*	***	Highest Rating
Filled Materials	*	***		
Material with Small Moulding Window	*	***		
Ease of Pin Setup	*	***		
Ease of Gate Manufacture	***	**		
Gate Life	***	*		

VG1 - Conical Valve Gate

D	d1	d2	AF	CP	AT	qT	HP
2.0	1.3	1.25	1.80	8	1.30	0.8	1.0
2.5	1.8	1.75	2.30	8	1.80	1.0	2.0
3.0	2.2	2.15	2.75	8	2.20	1.2	2.5
5.0	3.5	3.45	4.65	10	3.50	2.0	3.0

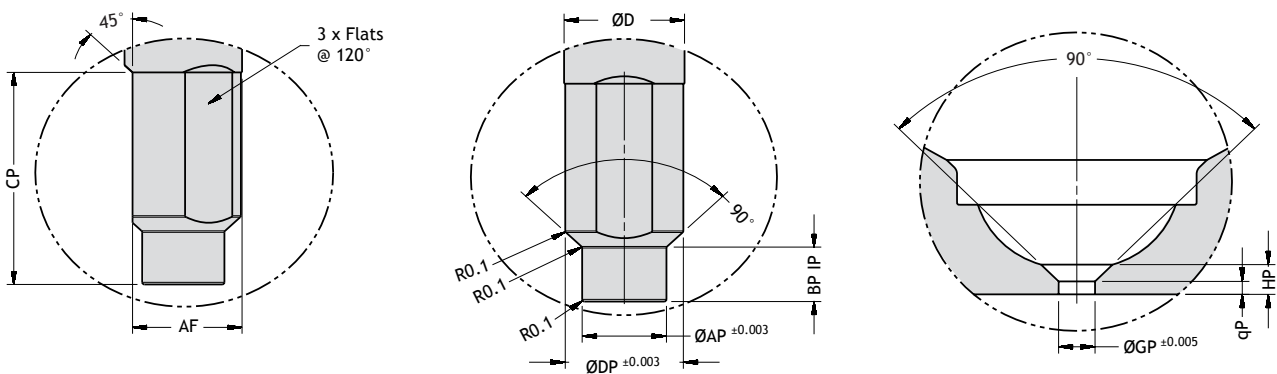
The pin will form a 0.1mm deep dimple on the part. Recommended unfilled polymers.



VG2 - Cylindrical Valve Gate

D	AP	BP	CP	DP	AF	GP	qP	HP
2.0	1.292	2.0	8	1.892	1.70	1.305	0.5	1.0
2.5	1.792	2.2	8	2.392	2.20	1.805	0.7	2.0
3.0	2.192	2.5	8	2.892	2.65	2.205	0.8	2.5
5.0	3.492	3.0	10	4.892	4.55	3.505	1.3	3.0

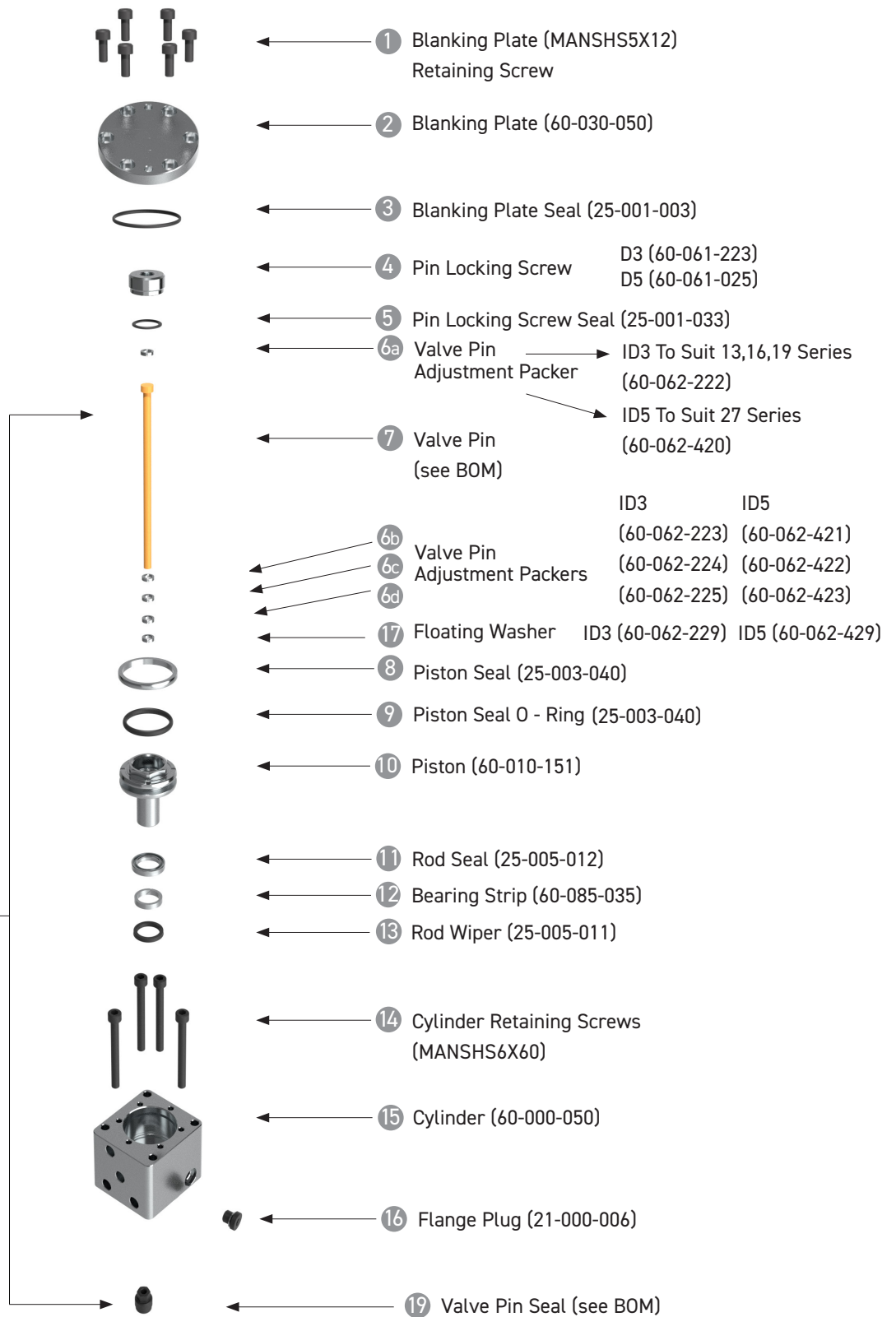
The pin will form a 0.1mm deep dimple on the part. Recommended for unfilled and filled polymers.



Exploded Diagram

A HVB40 CYLINDER ASSEMBLY

B HVB40 VALVE PIN + SEAL SUPPLIED SEPARATELY



Note

1. HVB40 Cylx Hybrid Spares Kit (80-000-105)
Includes Seals, Wear Ring Strip and Grease
2. Piston Seal Installation Tool (60-090-020), (60-090-021)
3. Piston Hex Socket Tool (60-085-226)
4. Piston Extraction Tool (60-085-022)

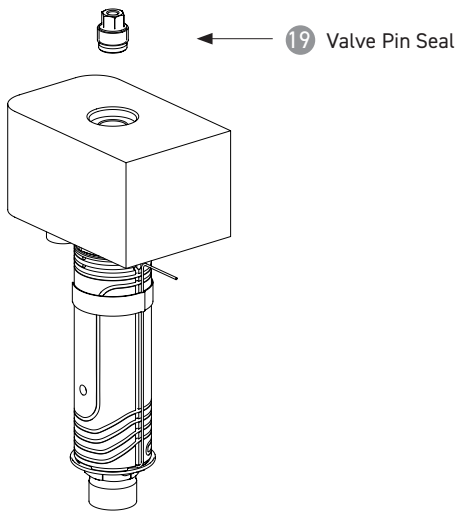
Installation and Pin Adjustment Guide

PRE-INSTALLATION

1. Verify the actuator pockets and hose channels are machined in the back plate as shown in figure 7.
2. Ensure there are no sharp edges or burrs.
3. Cut pins to length and profile end to conical or cylindrical (refer nozzle approval drawing).
4. Pin and seal are a matched set and must remain paired.

VALVE CYLINDER ASSEMBLY

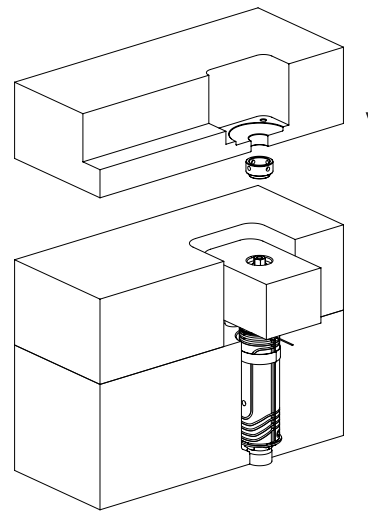
ONE



Apply heat resistant nickel based anti-seize grease to the thread of the **Valve Pin Seal 19** and screw into the manifold and tighten to 20Nm.

Ensure pins slide smoothly through the pin seal after tightening.

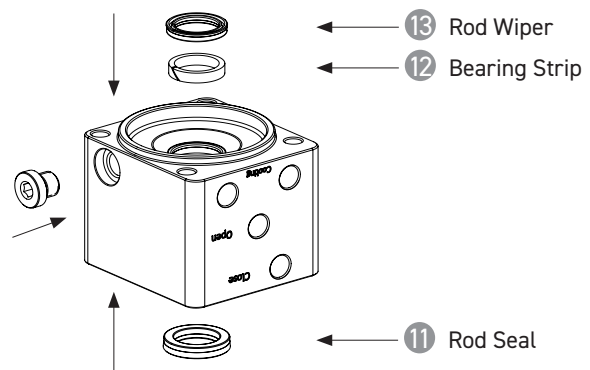
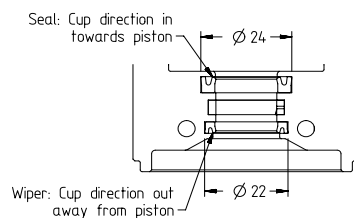
TWO



Fit manifold to manifold plate and fit spacer to manifold, and fit backplate.

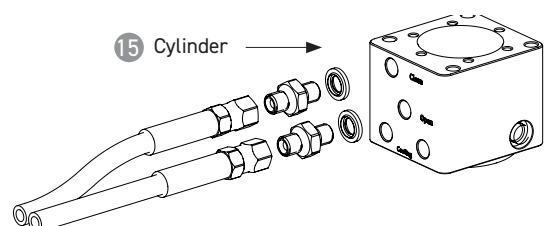
THREE

Fit the Rod Seal **11** with the cup groove towards the piston. Fit the bearing strip **12** in the centre groove, then fit the Rod Wiper **13** with the cup groove facing away from the piston.



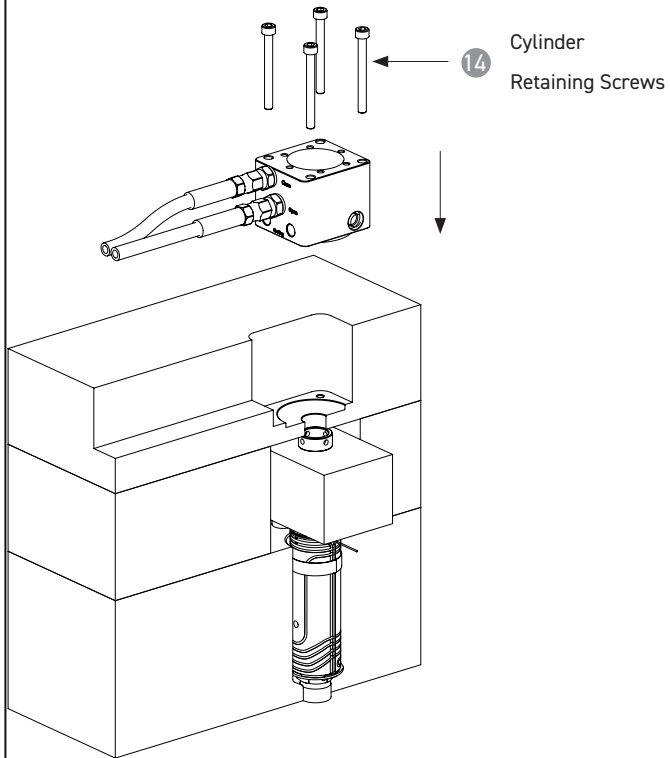
FOUR

Install all actuation and hoses to the **Cylinder 15** (G1/8 threads) and mould connections, and ensure all connections are correct.



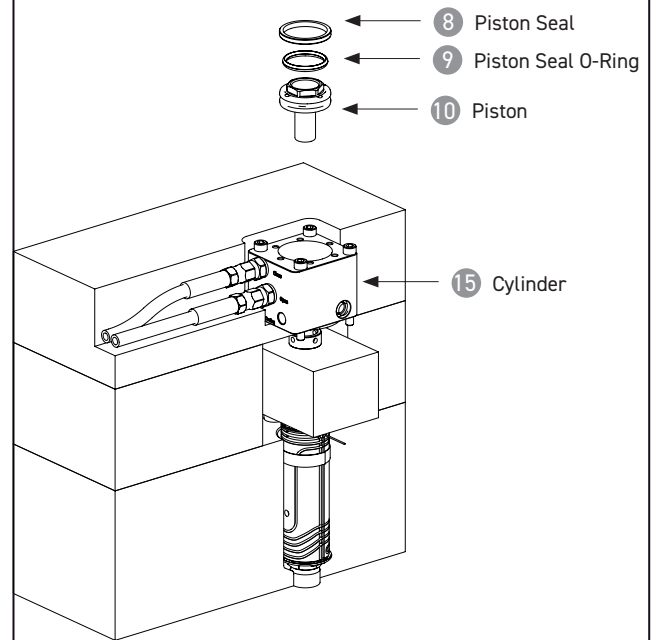
VALVE CYLINDER ASSEMBLY CONT...

FIVE



Fit the cylinder to the back plate. Secure with **Cylinder Retaining Screws** 14 and tighten to 16Nm.

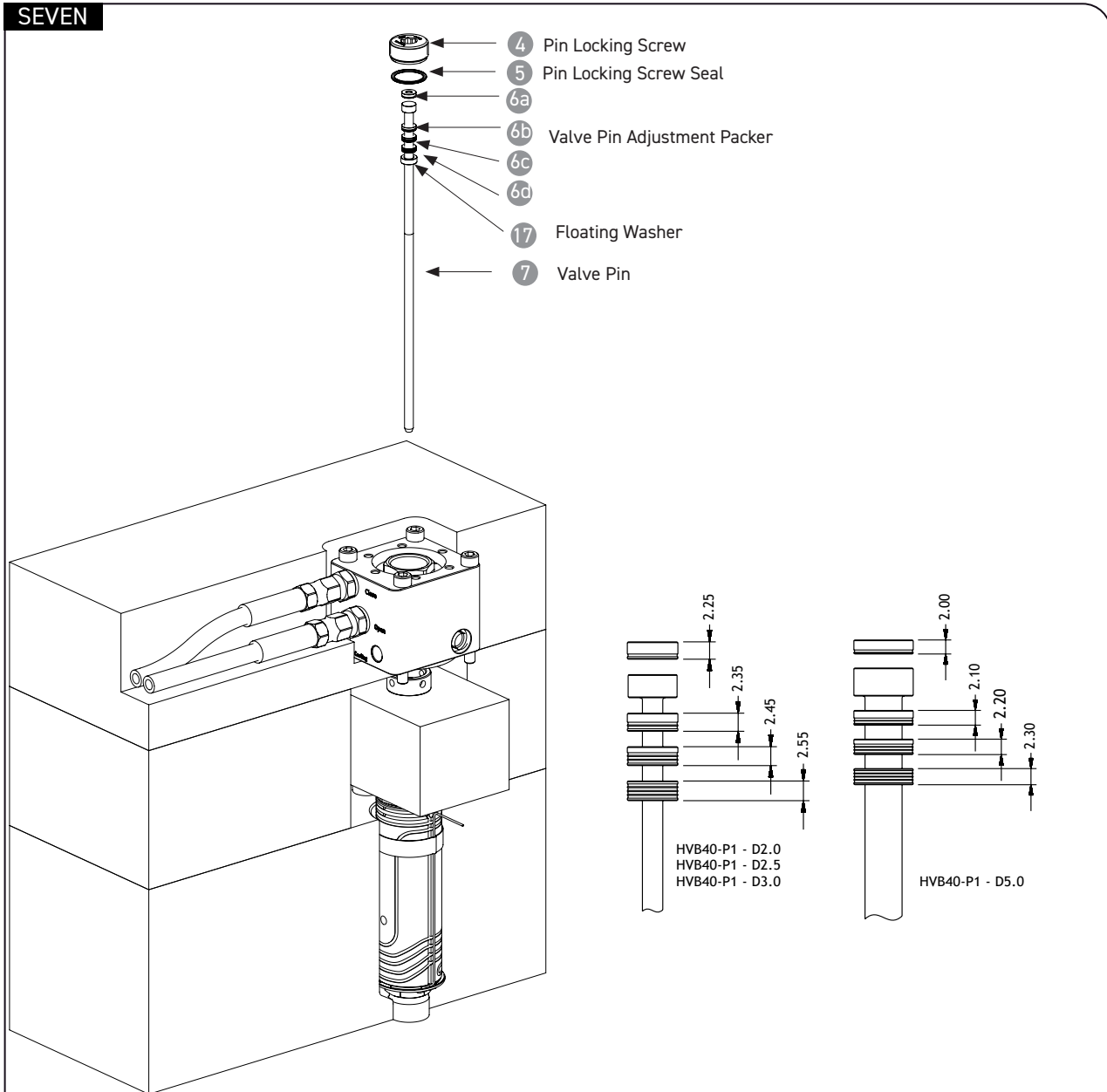
SIX



Fit the **Piston Seals** 8 & 9 to the **Piston** 10. Apply high temperature silicon grease to the cylinder bore, **Piston Seals** 8 & 9.

Fit the **Piston** 10 to the **Cylinder** 15.

VALVE CYLINDER ASSEMBLY CONT...

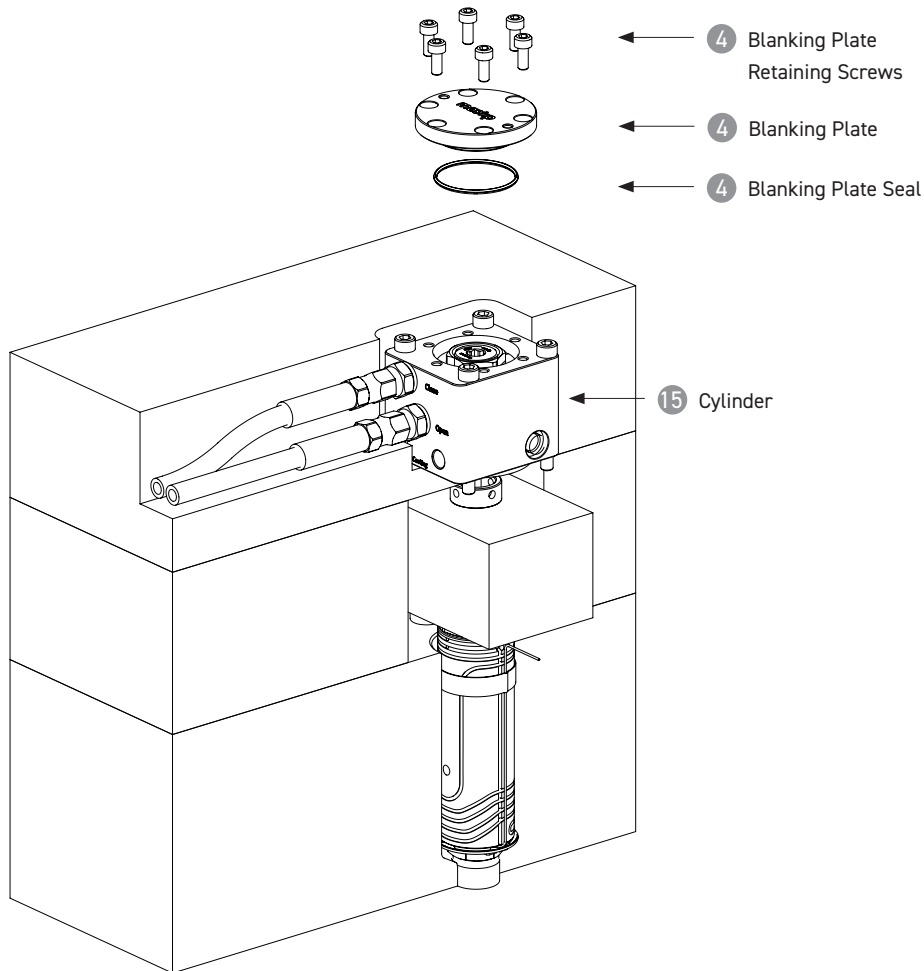


Insert the **Valve Pin Adjustment Packers** 6b, 6c & 6d and **Floating Washer** 17 onto the **Valve Pin** 7. Ensure the correct packer thickness is in the correct position (Recommend starting with the thinnest packer above the pin head, then adjust to suit if necessary) and ensure **Floating Washer** 17 is the last packer against piston (Note: the floating washer has a larger diameter than the adjustment packers) . Fit the **Valve Pin** 7 to the **Piston** 10.

Fit the remaining **Valve Pin Adjustment Spacer** 6a, above the **Valve Pin** 7 head. Fit the **Pin Locking Screw Seal** 5 to the **Piston** 10. Fit the **Pin Locking Screw** 4 to the **Piston** 10 and tighten to 40Nm.

VALVE CYLINDER ASSEMBLY CONT...

EIGHT



Fit the **Blanking Plate Seal** 3 to the **Blanking Plate** 2. Fit the **Blanking Plate** 2 to the **Cylinder** 15, secure with **Blanking Plate Retaining Screws** 1 and tighten to 9Nm.

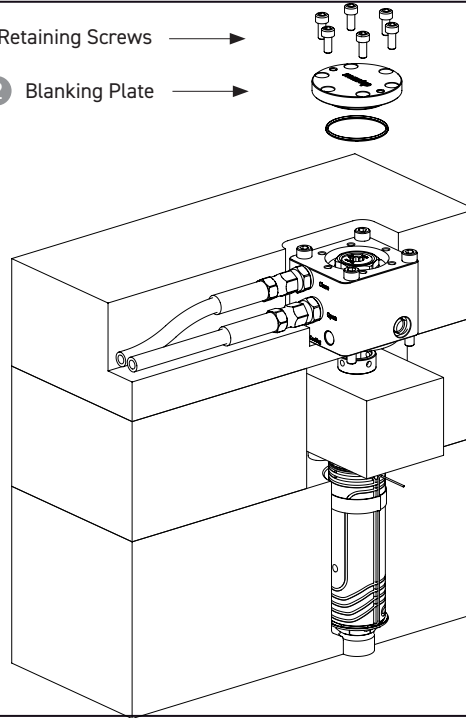
PIN HEIGHT ADJUSTMENT

ONE

- 1 Blanking Plate Retaining Screws
- 2 Blanking Plate

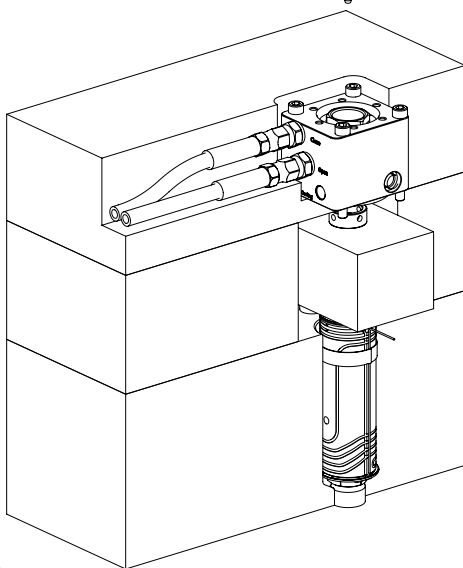
Remove **Blanking Plate Retaining Screws**

1 and **Blanking Plate** **2**



TWO

- 4 Pin Locking Screw
- 5 Pin Locking Screw Seal
- 6a
- 6b
- 6c
- 6d
- 17 Floating Washer
- 7 Valve Pin



Remove the **Pin Locking Screw** **4** and seal

Remove the **Valve Pin Adjustment Packer** **6a**

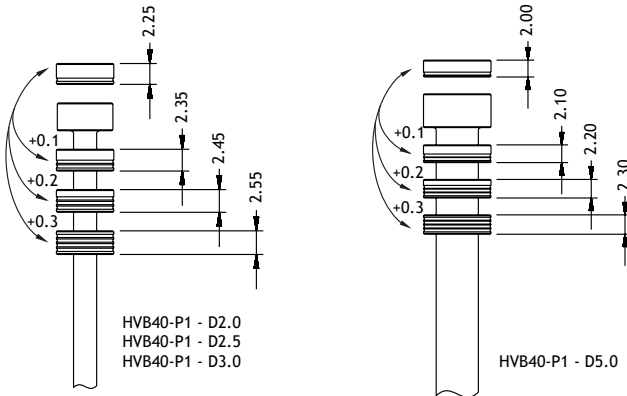
Remove the **Valve Pin** **7**

Remove the remaining **Valve Pin Adjustment Packers** **6b**, **6c** & **6d** and **Floating Washer** **17** (Note: the floating washer has larger a diameter than the adjustment packers)

PIN HEIGHT ADJUSTMENT

THREE

Minor Adjustment

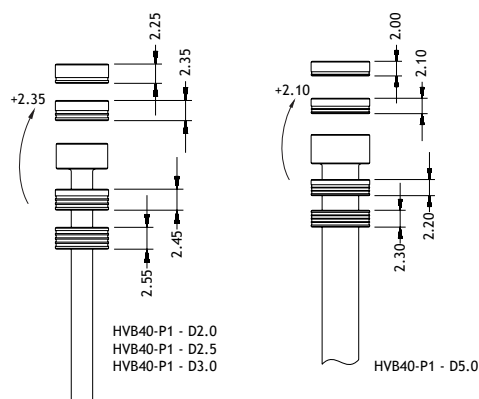


Swap Valve Pin Adjustment Packers

6a, 6b, 6c & 6d to achieve small pin adjustments
(different packer = different height)

FOUR

Major Adjustment

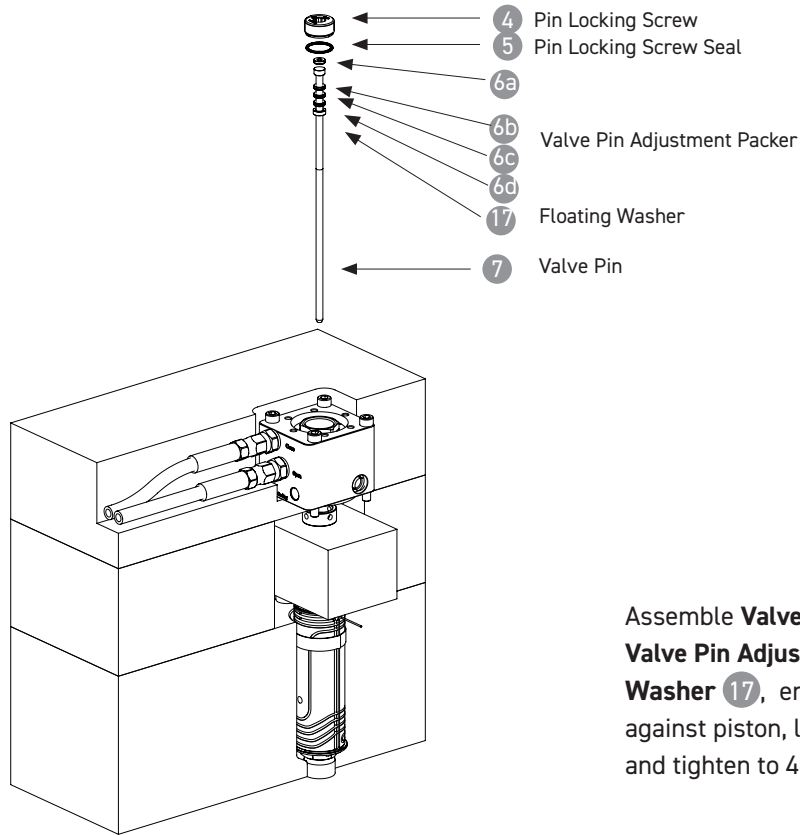


Move one or more Valve Pin Adjustment

Packers 6a, 6b, 6c & 6d from below the pin head to above the pin head to achieve large pin adjustment

PIN HEIGHT ADJUSTMENT CONT.....

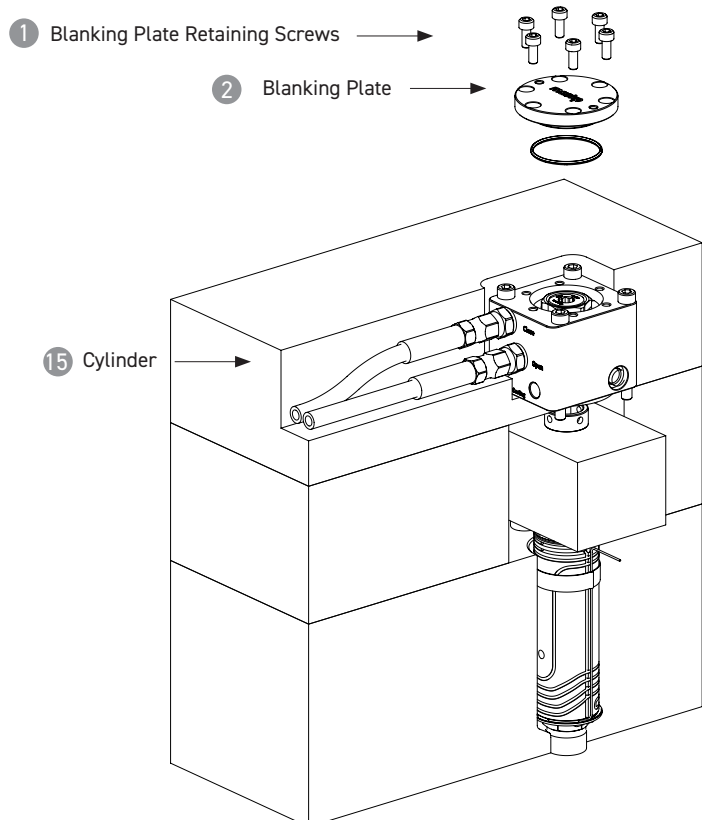
FIVE



Assemble **Valve Pin 7** (ensure pins are matched to seals), **Valve Pin Adjustment Packers 6a, 6b, 6c, & 6d** and **Floating Washer 17**, ensure **Floating Washer 17** is the last packer against piston, locking screw seal the **Pin Locking Screw 4** and tighten to 40Nm

SIX

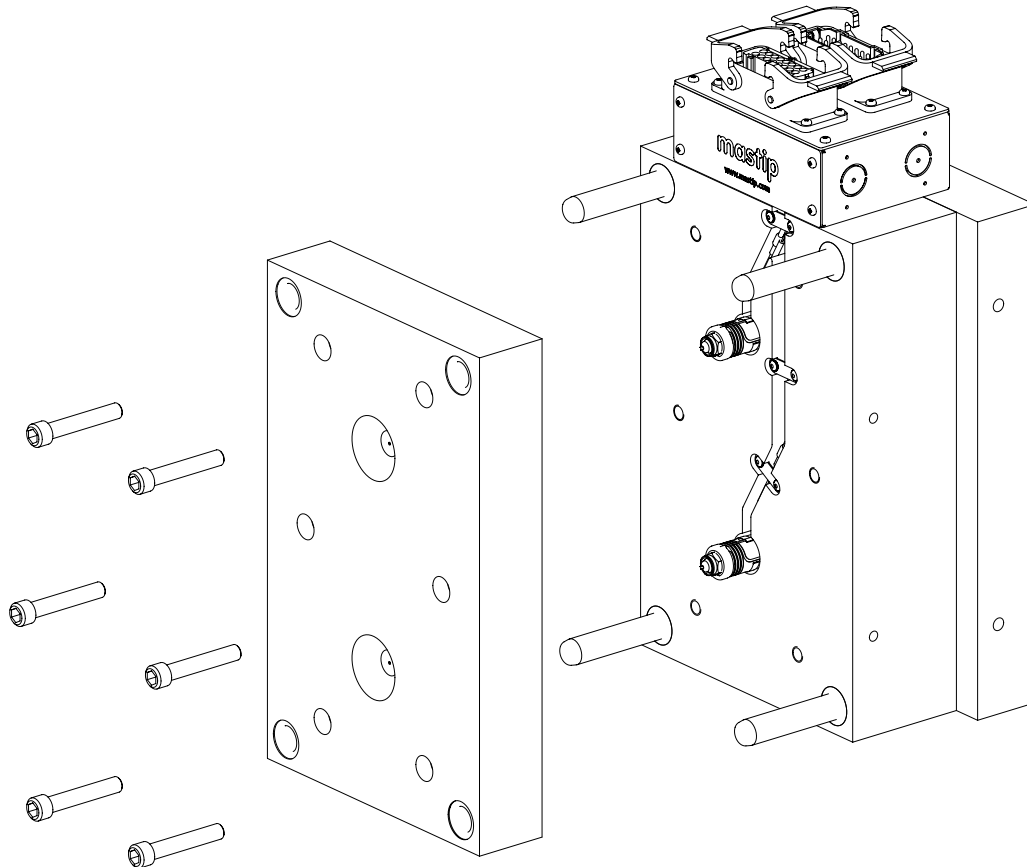
Fit the **Blanking Plate 2** to the **Cylinder 15**, secure with **Blanking Plate Retaining Screws 1** and tighten to 9 Nm.



Valve Pin Guide Replacement

Caution: Where possible Mastip recommends removing and assembling the valve pin guide from the front (Nut/Tip) side of the mould.

→ **Guide replacement from the front (cavity side) of the mould**

ONE

Ensure the mould plates are at room temperature

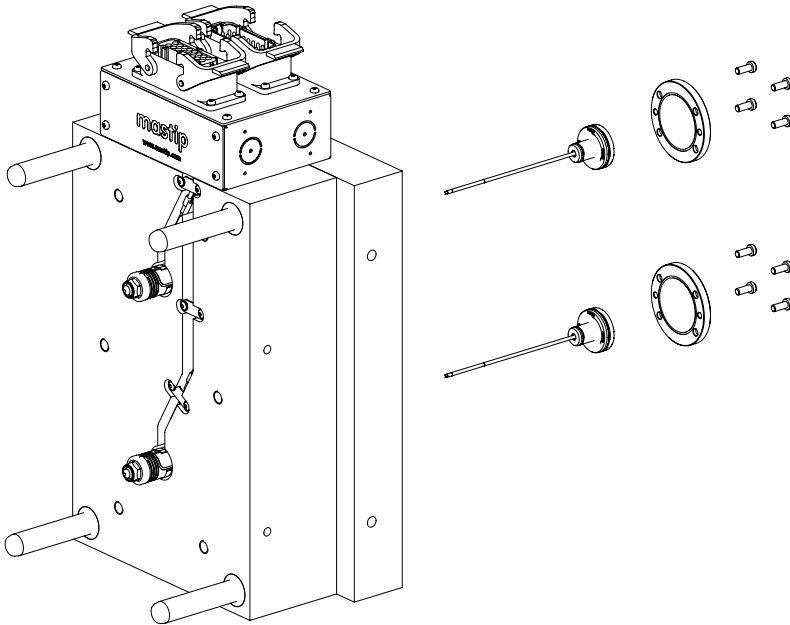
Remove the mould plates to expose the nozzle nut and tip

Heat up the nozzle to the melt temperature of the plastic inside

(⚠ Care must be taken not to touch any of the heated components ⚠)

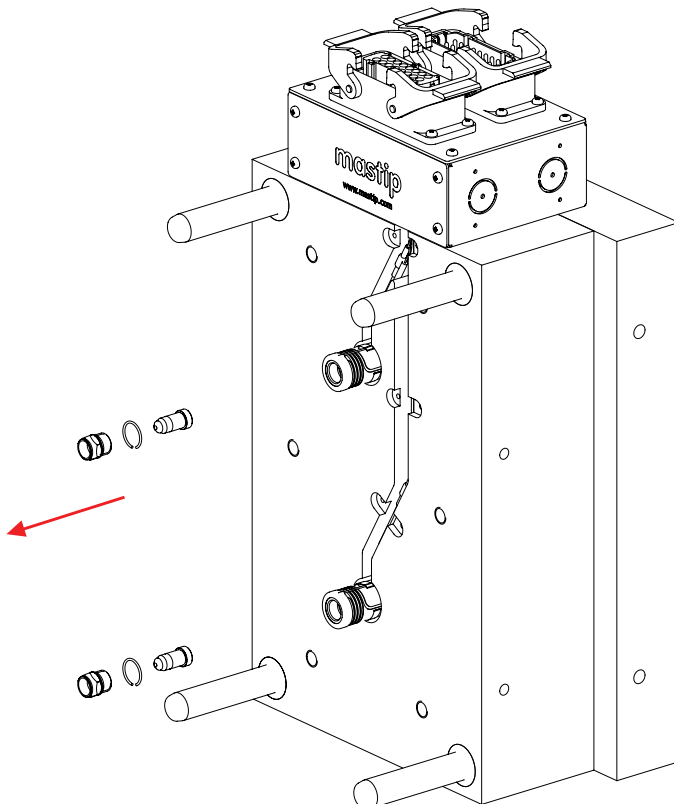
VALVE PIN GUIDE REPLACEMENT CONT.....

TWO



Remove the valve pin and piston assembly from the system using extractor tool (60 - 085 - 015)

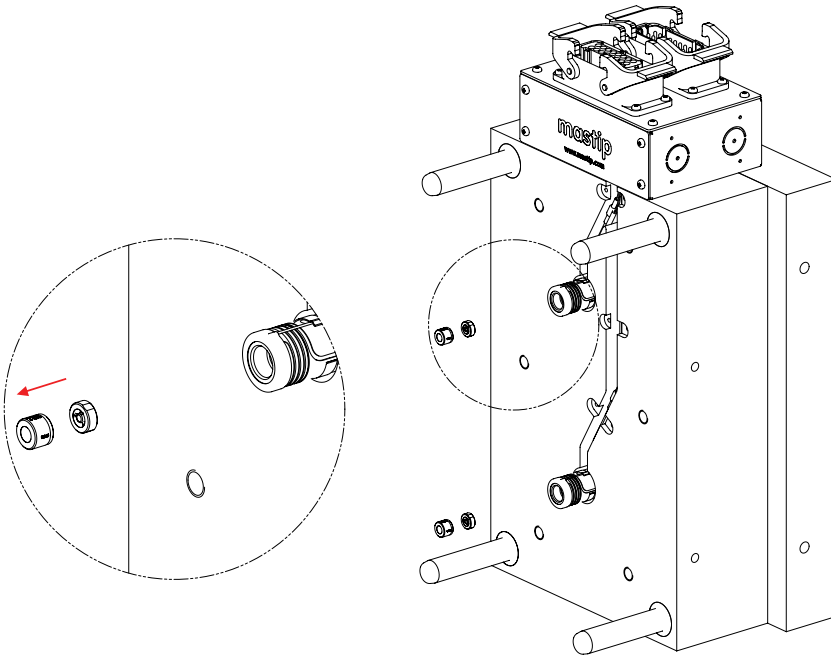
THREE



Allow the manifold and nozzles to cool, then remove the nozzle nut and tip, taking care not to cause any damage to the components

VALVE PIN GUIDE REPLACEMENT CONT.....

FOUR



Using a hook carefully remove the packer and valve pin guide from the nozzle taking care not to cause any damage

Reassemble in the reverse order



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