

Cylix Hybrid Actuation Technical Guide

Pneumatic/Hydraulic
HVM Manifold 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 HVM Cylix Actuators are bolted to the manifold and must be protected from overheating to ensure long seal life. During system start-up, operation and shut-down the cooling water supply to the actuators must continue flowing to ensure the seals are thermally separated from the hot manifold and excessive heat does not cause premature failure of the components.

Cooling Water Medium

1. Water quality and PH levels must be maintained to ensure it is clean and free of particulates and biological growth
2. Cooling water temperature must not exceed 150°C for actuators without limit sensors or 50°C with limit sensors
3. Cooling water pressure should not exceed 8 bar
4. Cooling water flow rate should be a minimum of 1 l /min. per unit
5. A maximum of 4 Cylix actuators may be connected in series for cooling

Actuator Start-up Procedure

1. Turn on all water chillers/cooling and ensure temperatures are as specified above
2. Turn on water cooling connections to actuators and check cooling flow is operating correctly
3. Continue with normal hot runner mould start-up procedure

Actuator Shut-down Procedure

Use normal hot runner mould shut-down procedures, ensuring all water cooling continues flowing to the actuators until the hot runner is below 150°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

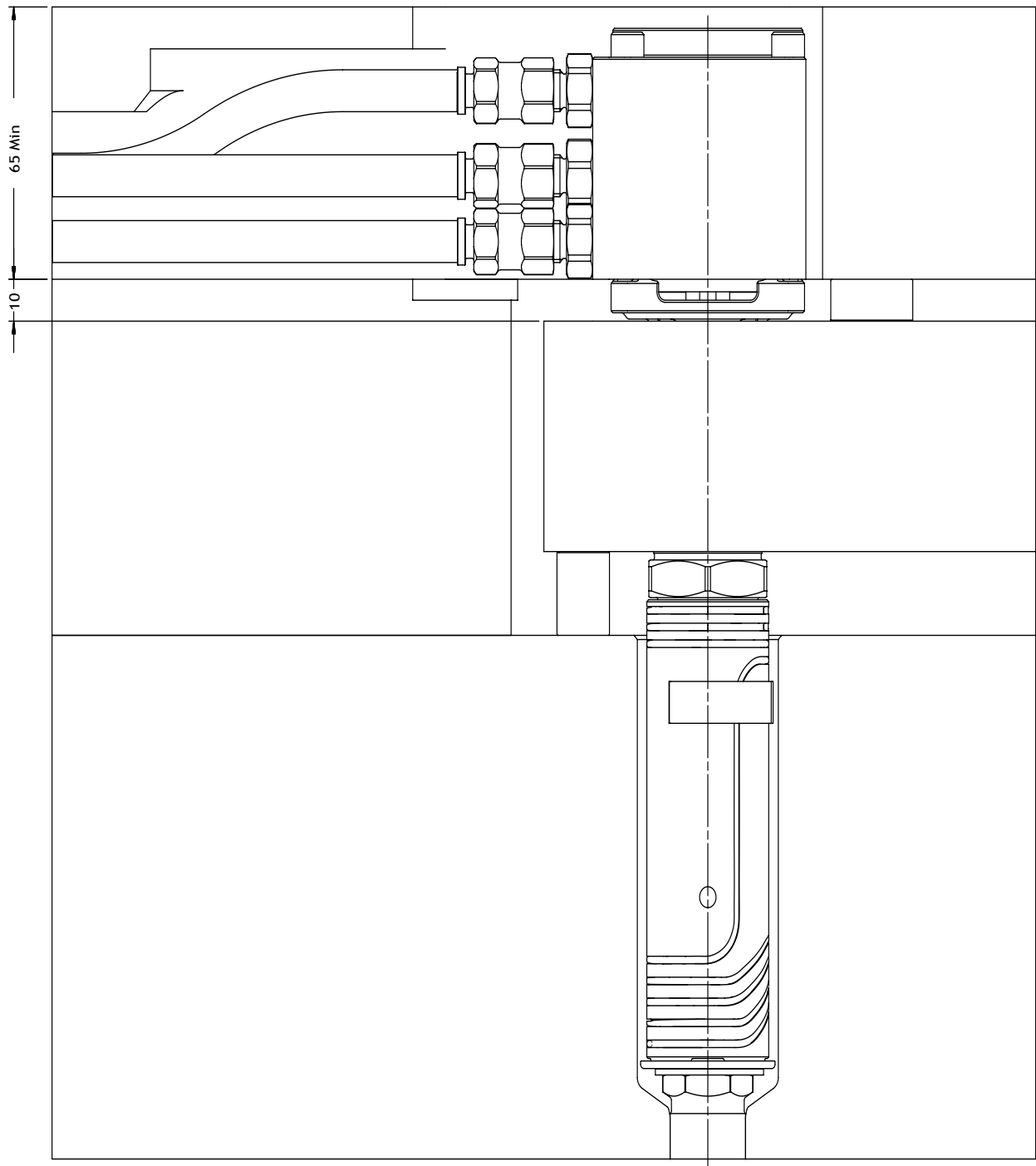


figure. 1

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

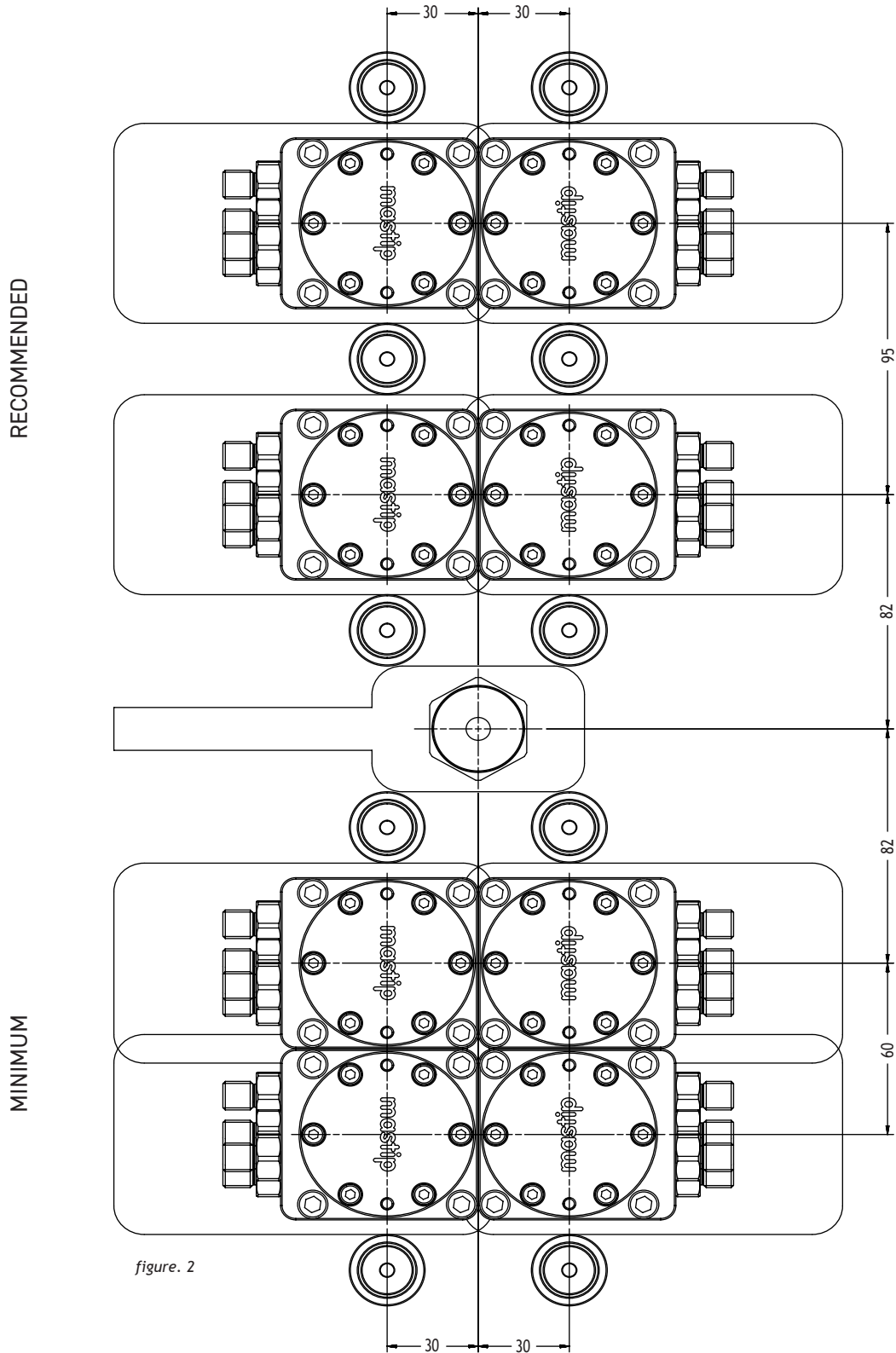


figure. 2

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 HVM40-8 Pin Calculations section to calculate required final pin lengths

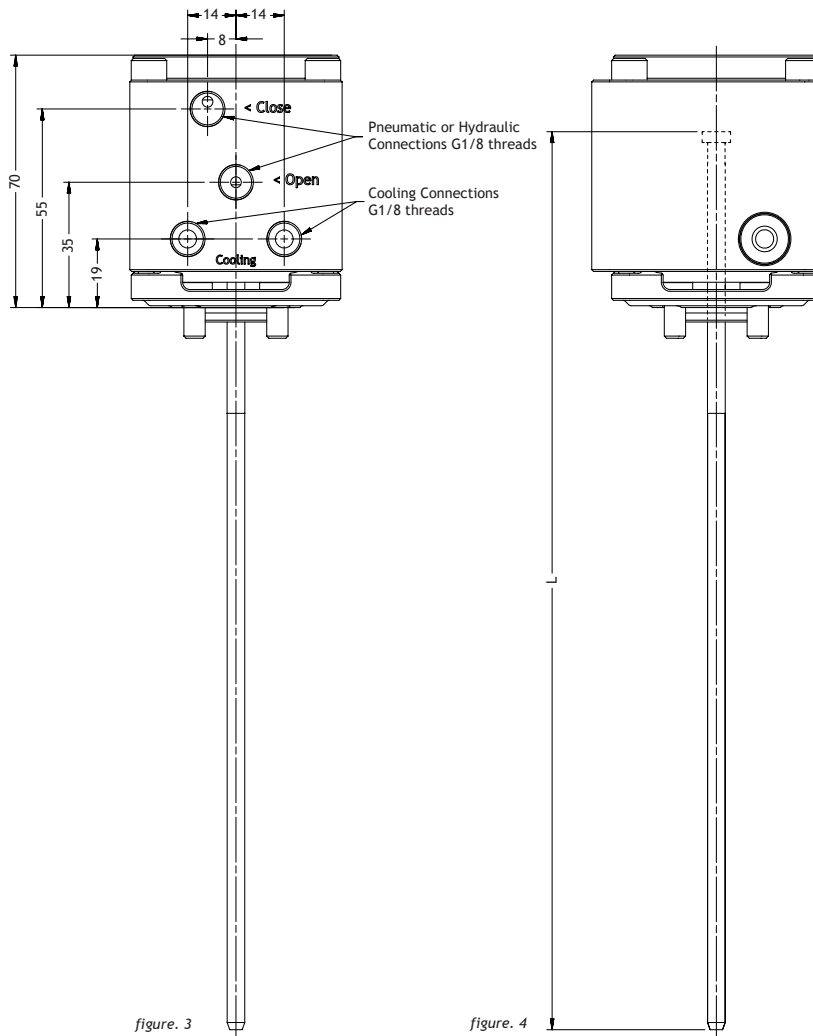
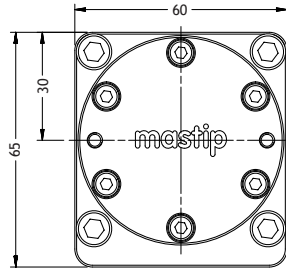


figure. 3

figure. 4

Nozzle Compability		
Description	Nozzle	Supplied Pin Size
HVM40-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

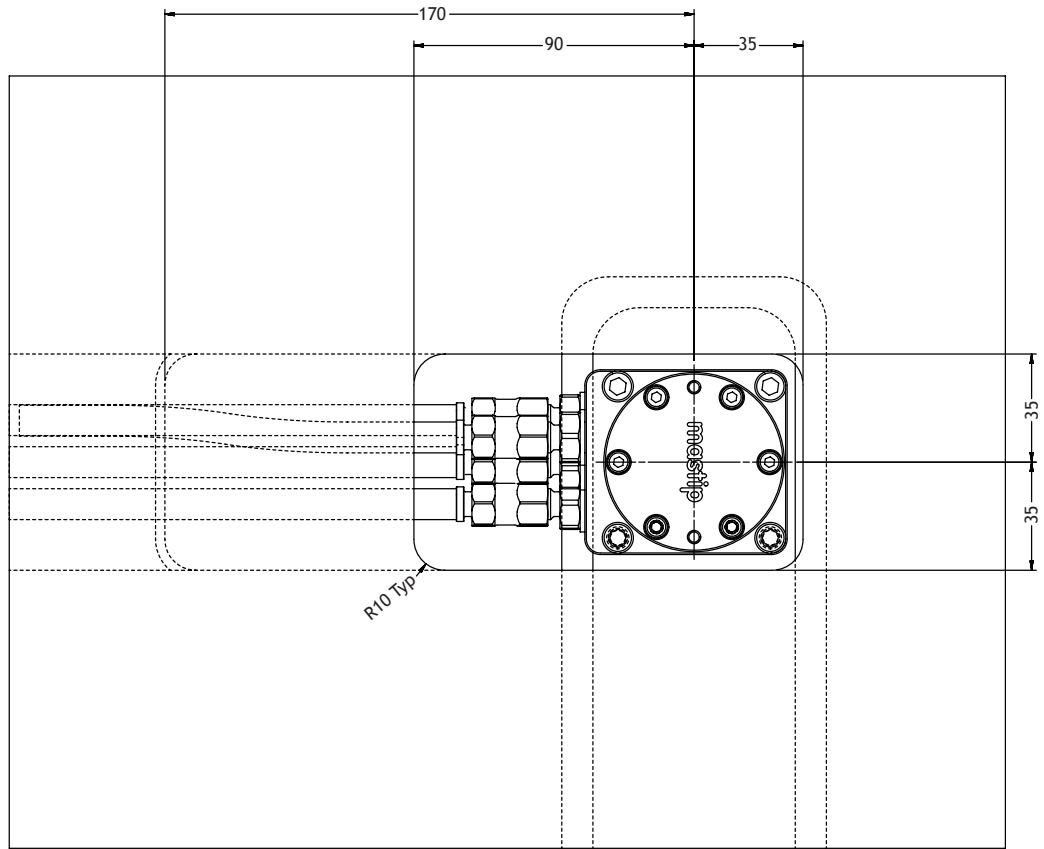


figure. 5

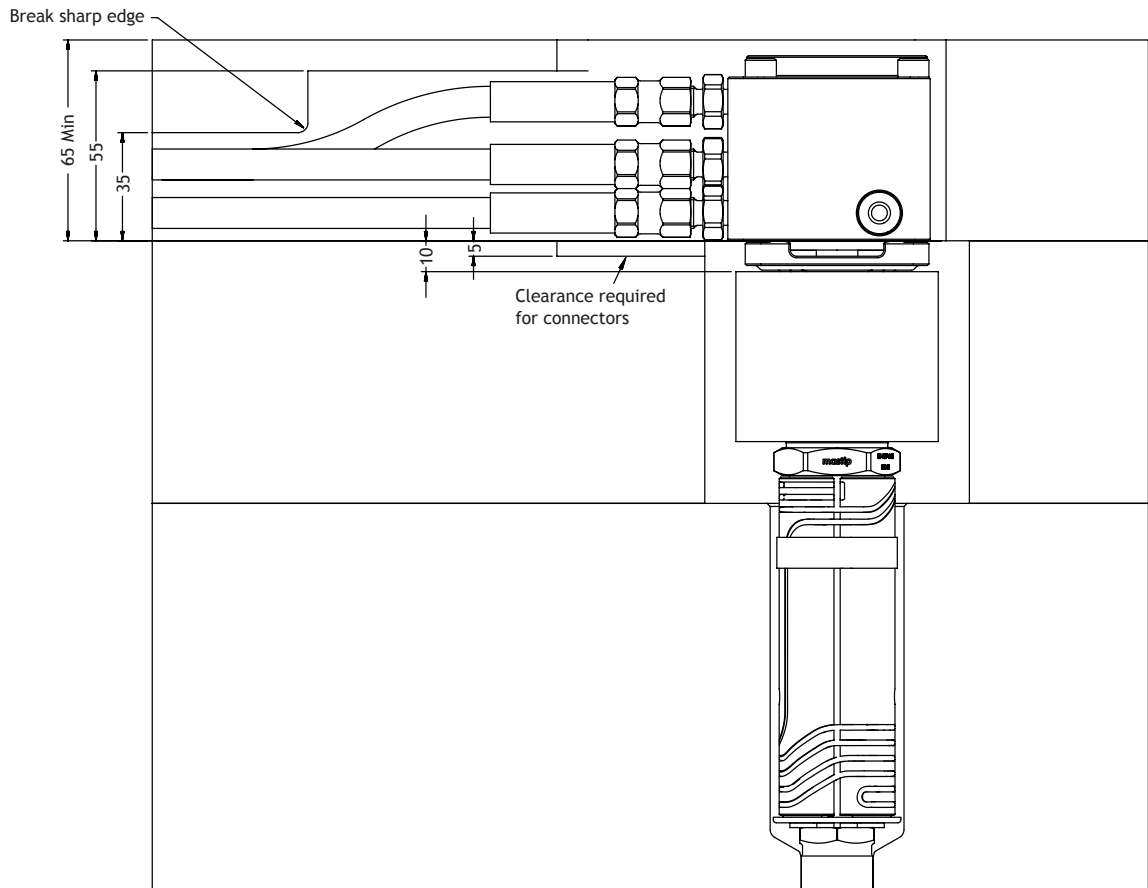


figure. 6

Plate Details - 90° Bend Exit

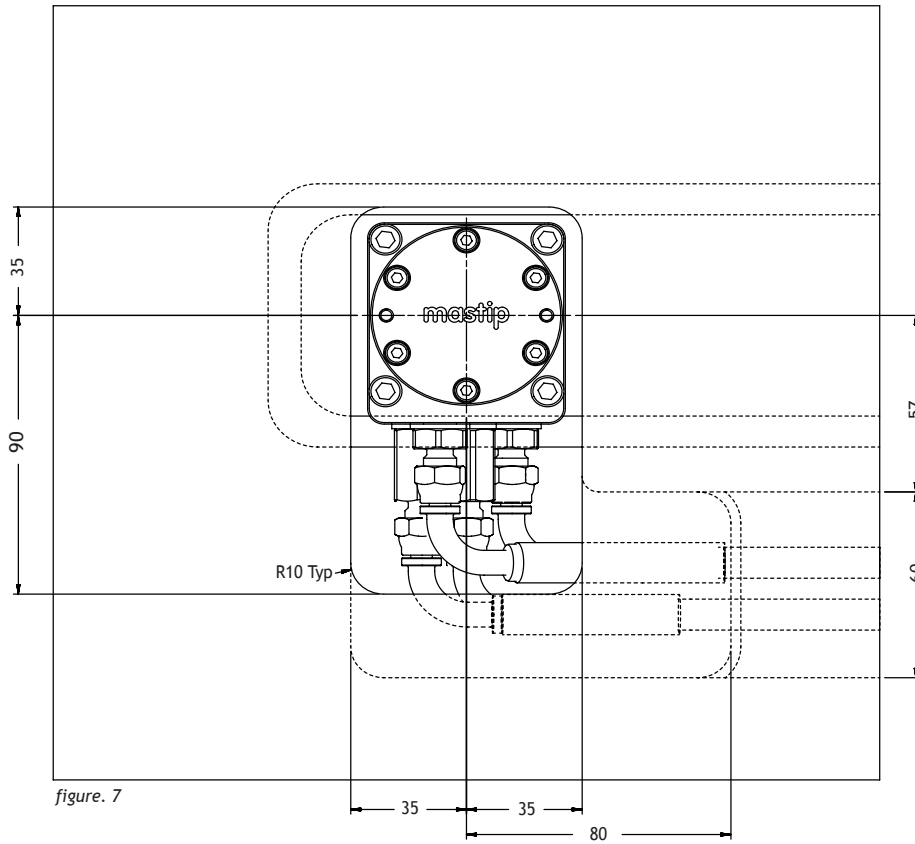


figure. 7

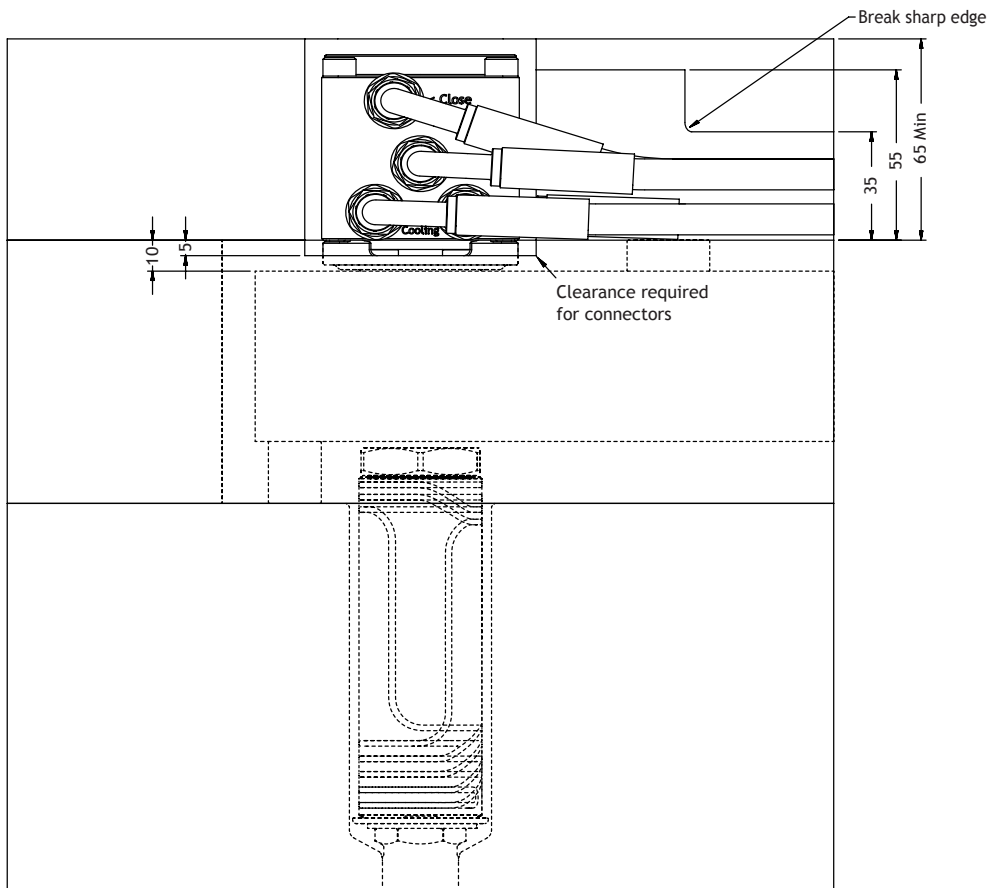


figure. 8

Pin Details

To calculate final pin length, use the following equation:

HVM40-P1 - D2.0	}	Pin Length = (Y=28.75) + 10.0 + X + L + 0.1
HVM40-P1 - D2.5		
HVM40-P1 - D3.0		

HVM40-P1 - D5.0	}	Pin Length = (Y=29.00) + 10.0 + X + L + 0.1
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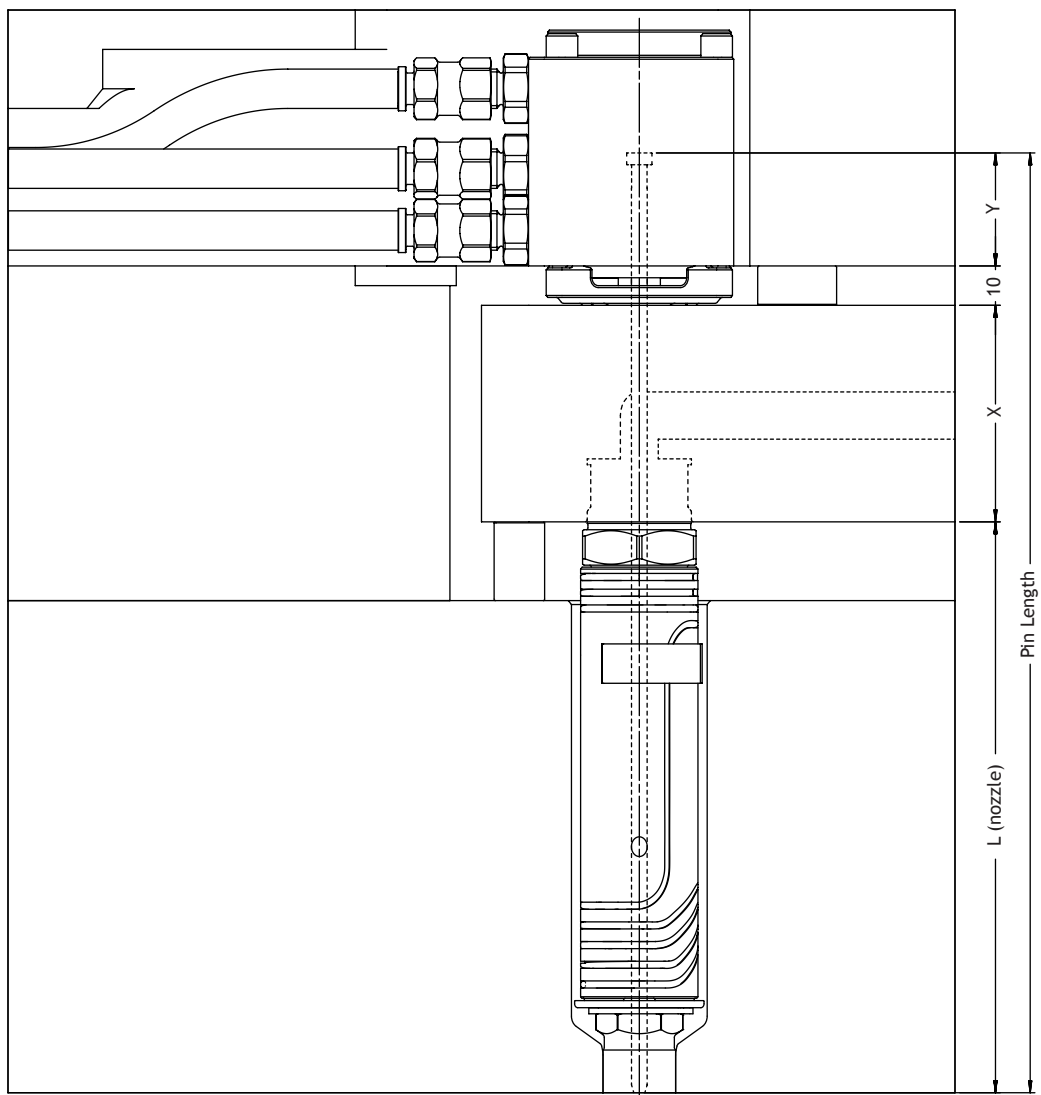


figure. 9

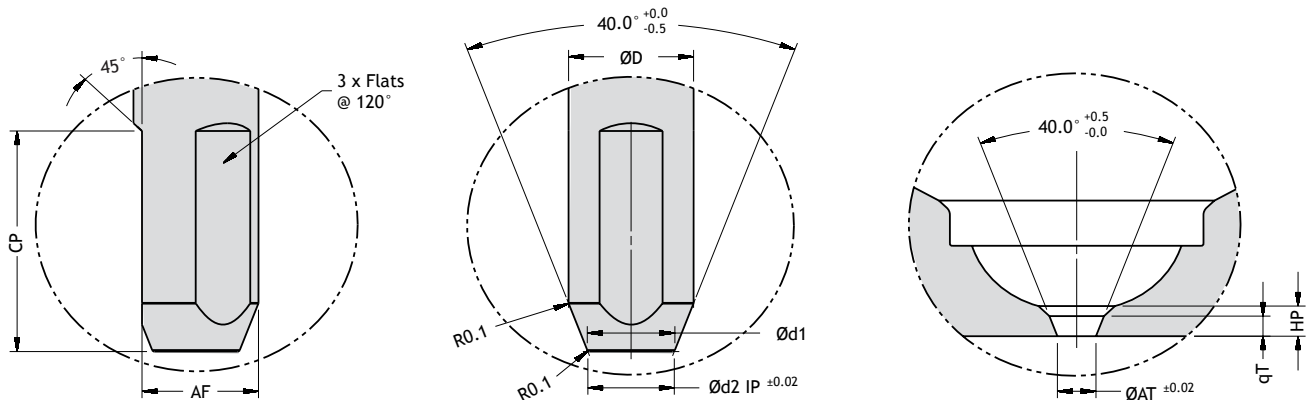
Conical and Cylindrical Valve Gate Recommendations

	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

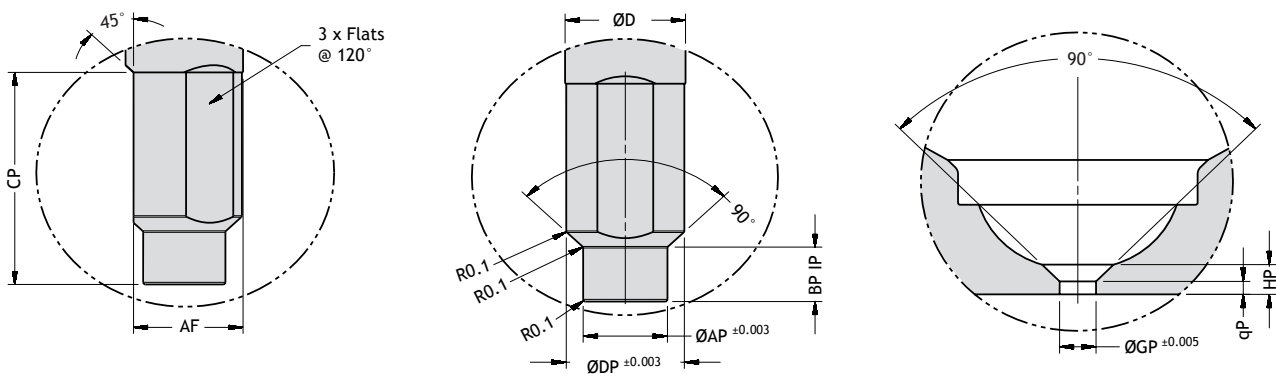
The pin will form a 0.1mm deep dimple on the part.
Recommended for unfilled polymers.



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

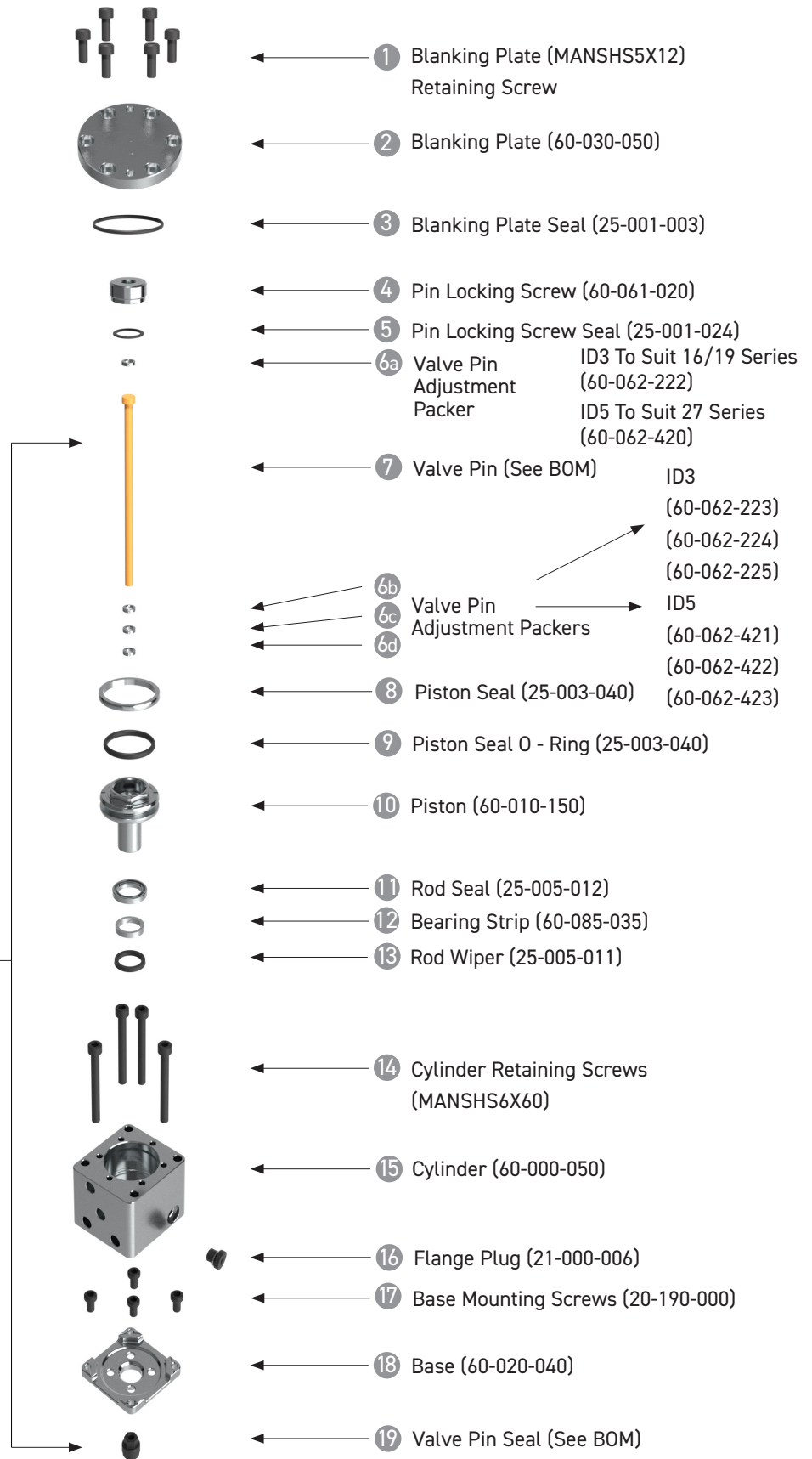
The pin will form a 0.1mm deep dimple on the part.
Recommended for unfilled and filled polymers.



Exploded Diagram

A HVB40 CYLINDER ASSEMBLY

B HVB40 VALVE PIN + SEAL SUPPLIED SEPARATELY



Note

1. HVM40 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)

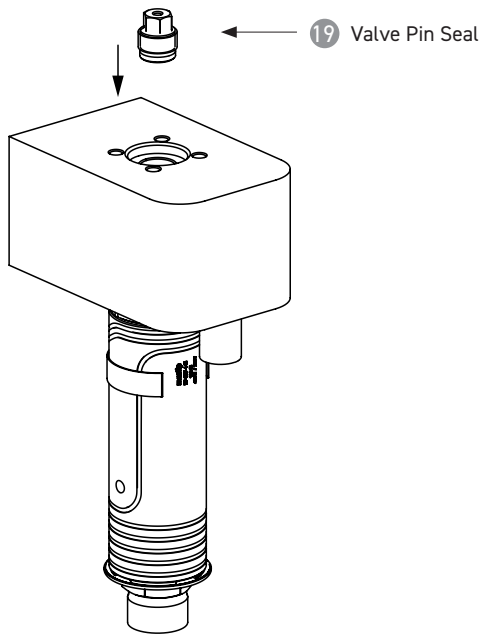
Installation and Pin Adjustment Guide

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.

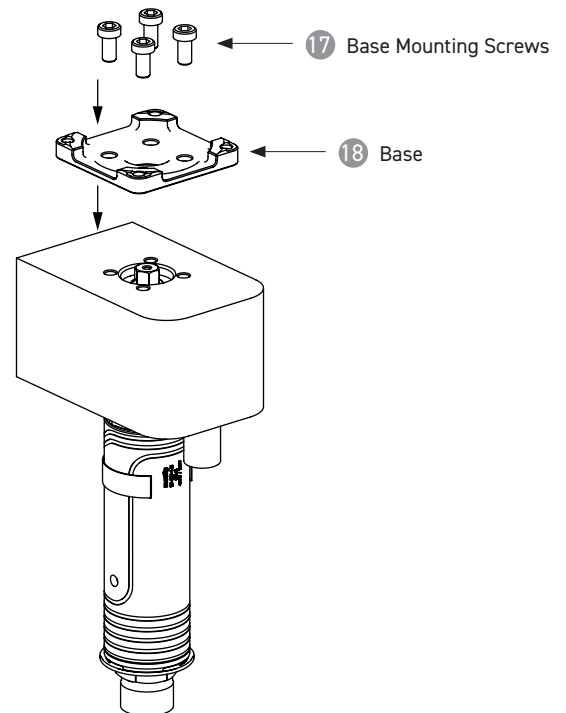
VALVE CYLINDER ASSEMBLY

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.

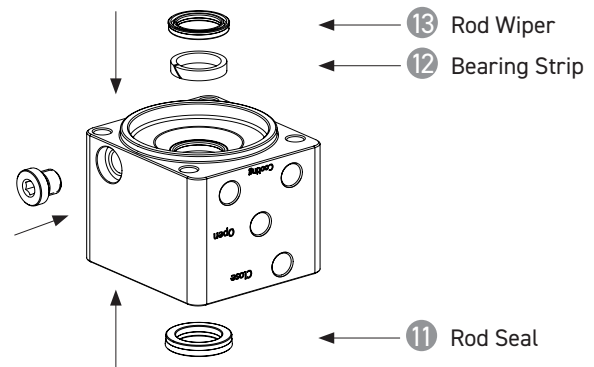
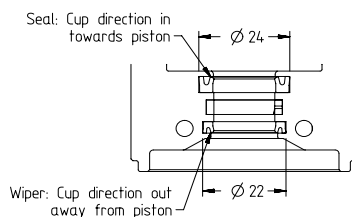
TWO



Mount the **Base** 18 onto the manifold and secure in place with the **Base Mounting Screws** 17 and tighten to 14Nm.

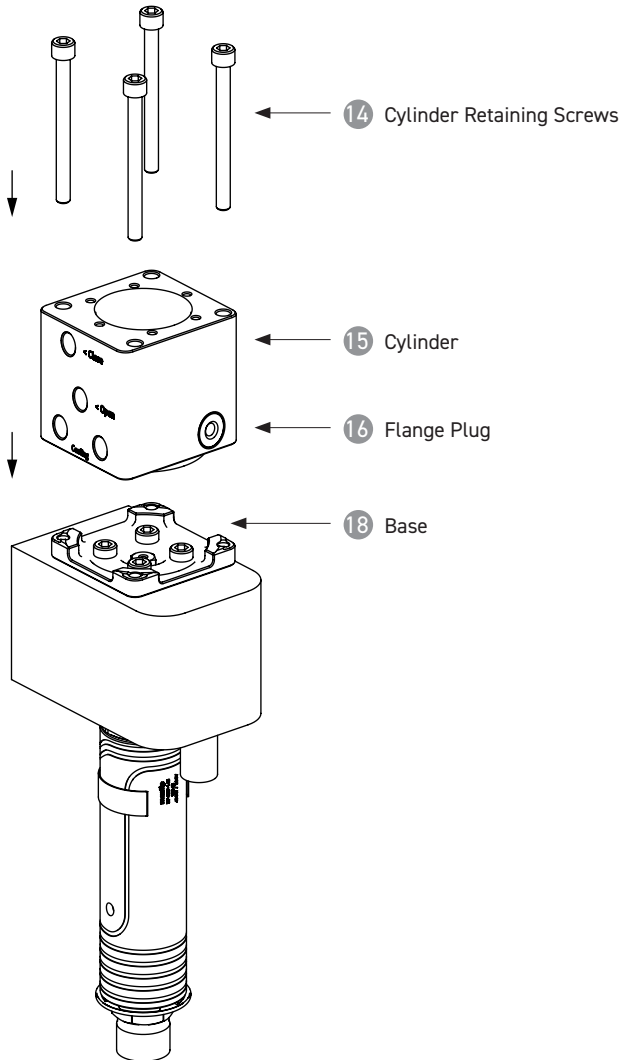
THREE

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.



VALVE CYLINDER ASSEMBLY CONT...

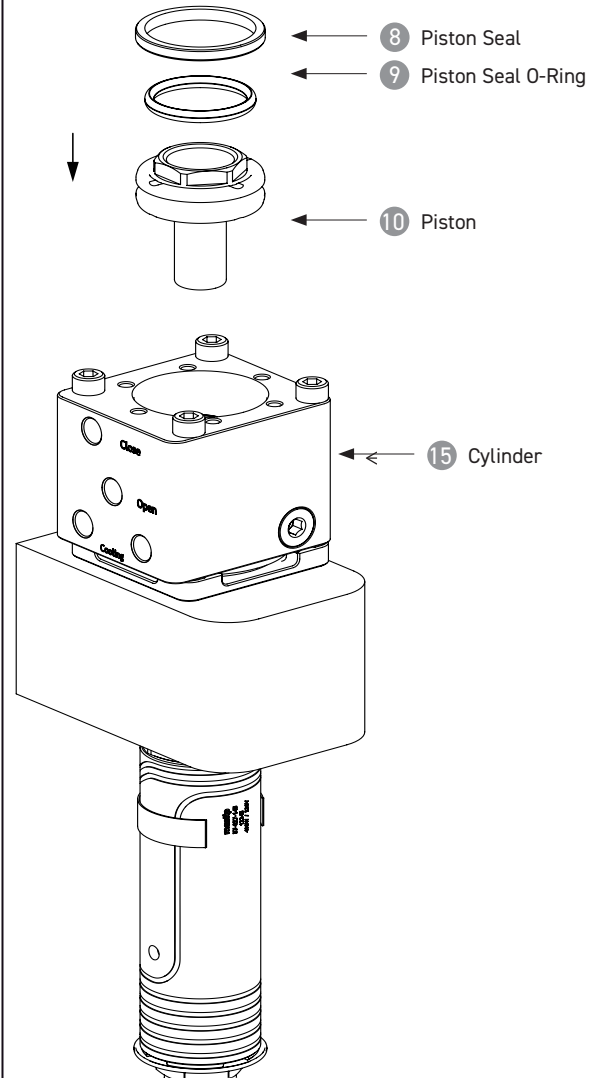
FOUR



Mount the **Cylinder 15** to the **Base 18**, orientate the **Cylinder 15** so the connections are facing the correct direction. Secure in place with **Cylinder Retaining Screws 14** and tighten to 16Nm.

Ensure the **Flange Plug 16** is tightly sealed in place in the cooling circuit.

FIVE

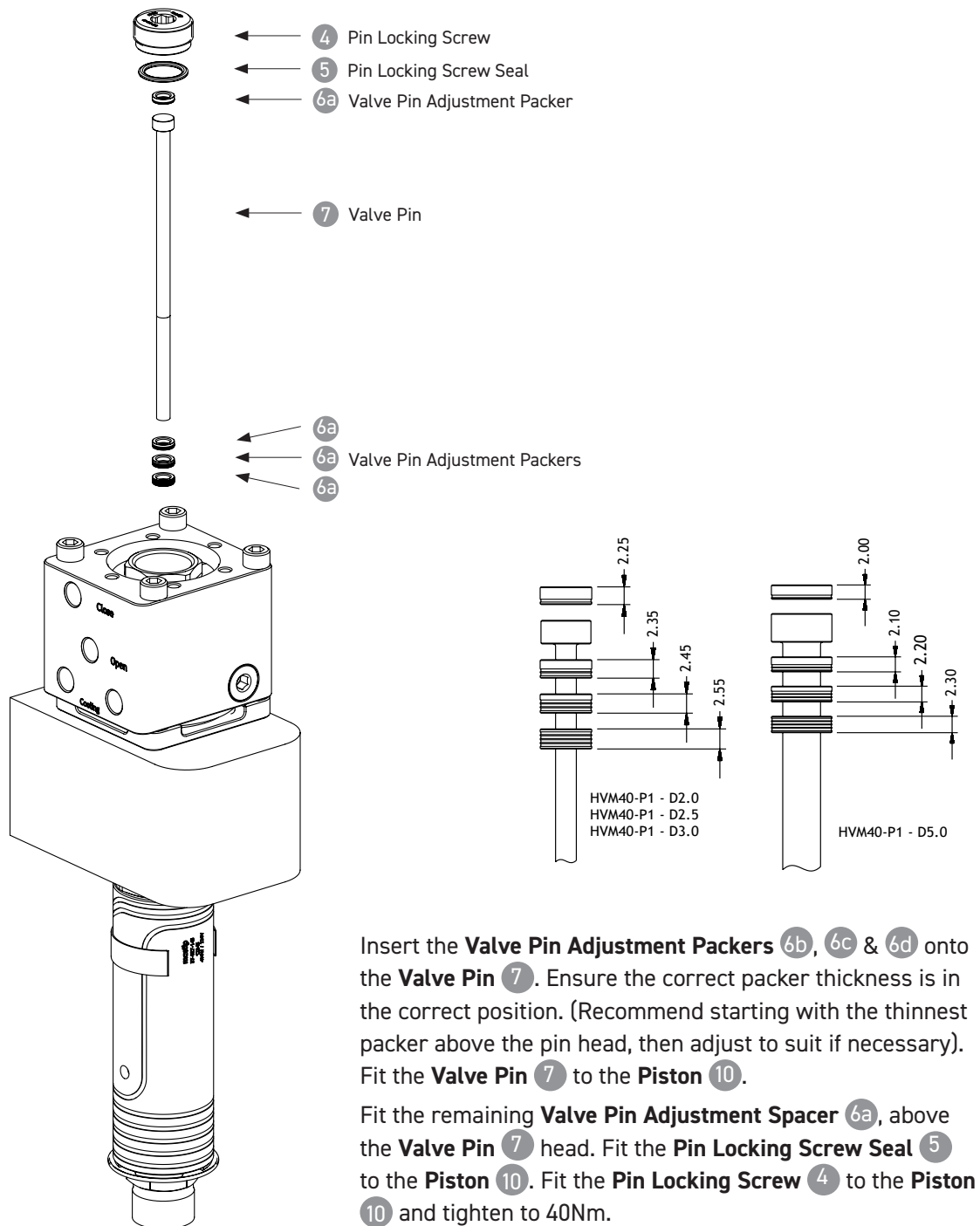


Fit the **Piston Seals 8** & **9** to the **Piston 10**. Apply high temperature silicon grease to the cylinder bore, **Piston Seals 8** & **9**.

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

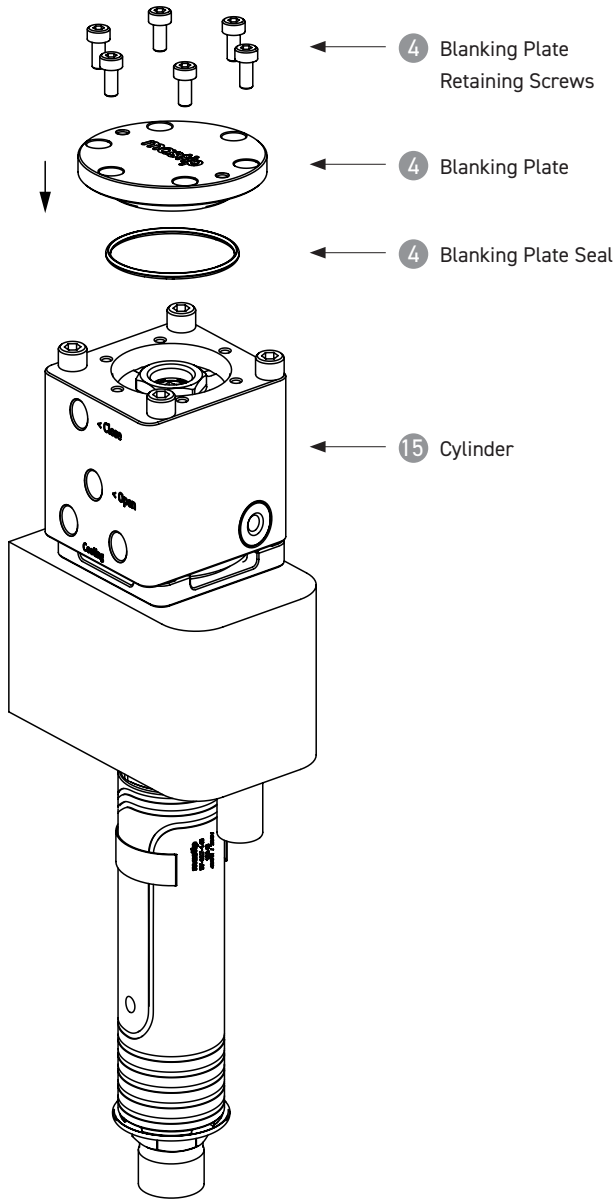
VALVE CYLINDER ASSEMBLY CONT...

SIX



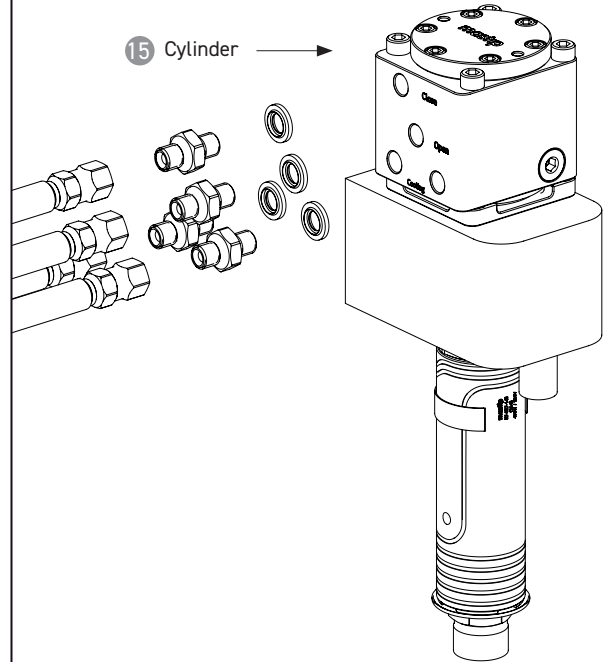
VALVE CYLINDER ASSEMBLY CONT...

SEVEN



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.

EIGHT



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

PIN HEIGHT ADJUSTMENT

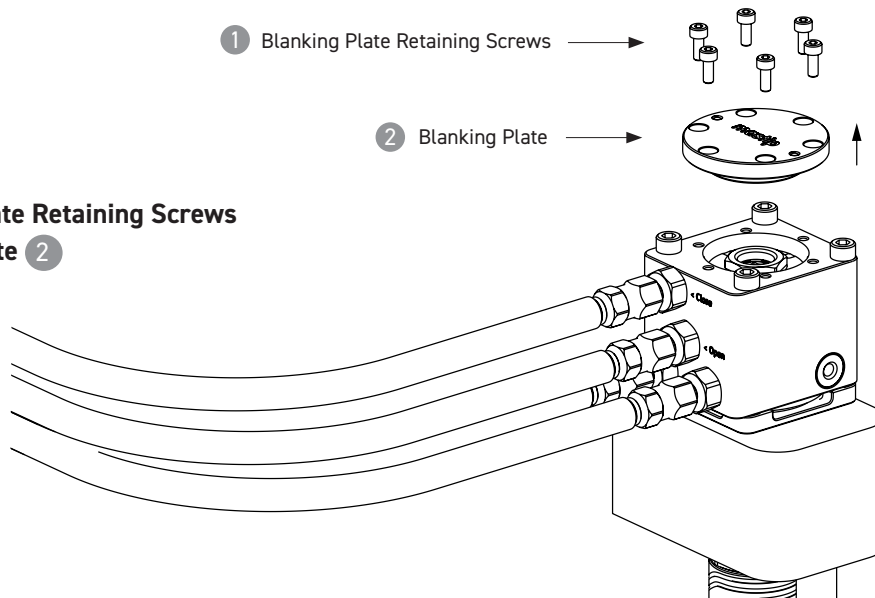
ONE

① Blanking Plate Retaining Screws

② Blanking Plate

Remove **Blanking Plate Retaining Screws**

① and **Blanking Plate ②**



TWO

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

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

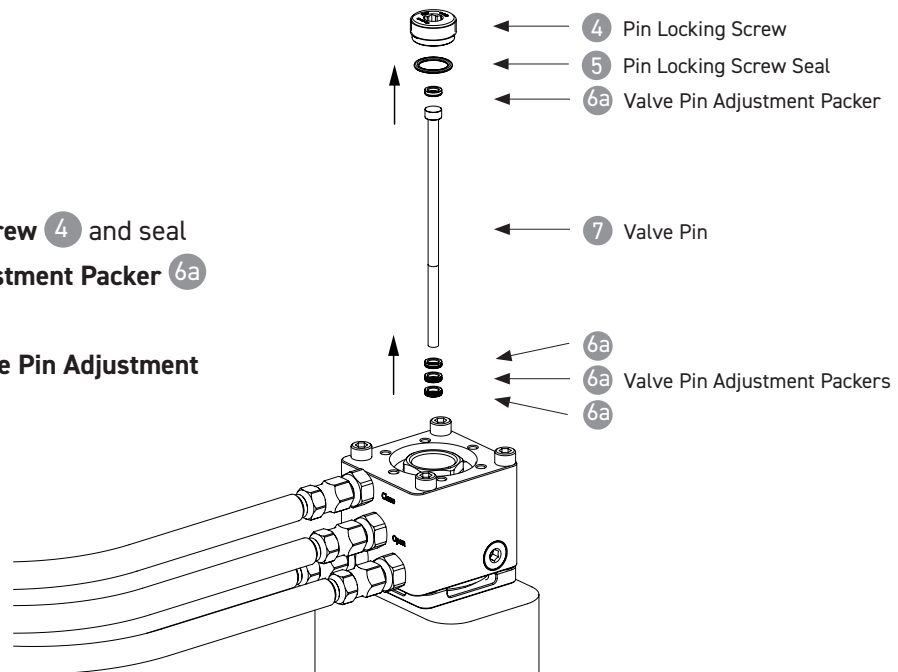
Remove the **Valve Pin ⑦**

Remove the remaining **Valve Pin Adjustment Packeters ⑥b, ⑥c & ⑥d**

④ Pin Locking Screw
⑤ Pin Locking Screw Seal
⑥a Valve Pin Adjustment Packer

⑦ Valve Pin

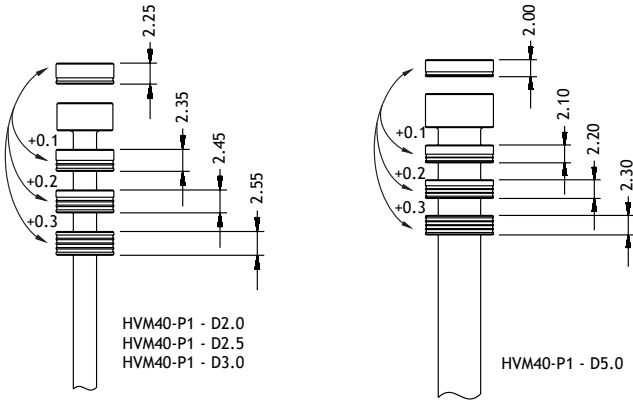
⑥a
⑥a Valve Pin Adjustment Packeters
⑥a



PIN HEIGHT ADJUSTMENT

THREE

Minor Adjustment

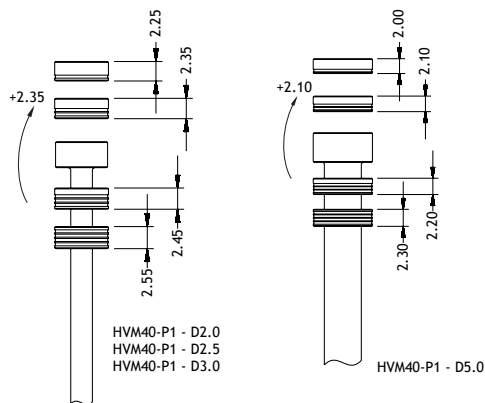


Swap **Valve Pin Adjustment Packers**

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

FOUR

Major Adjustment



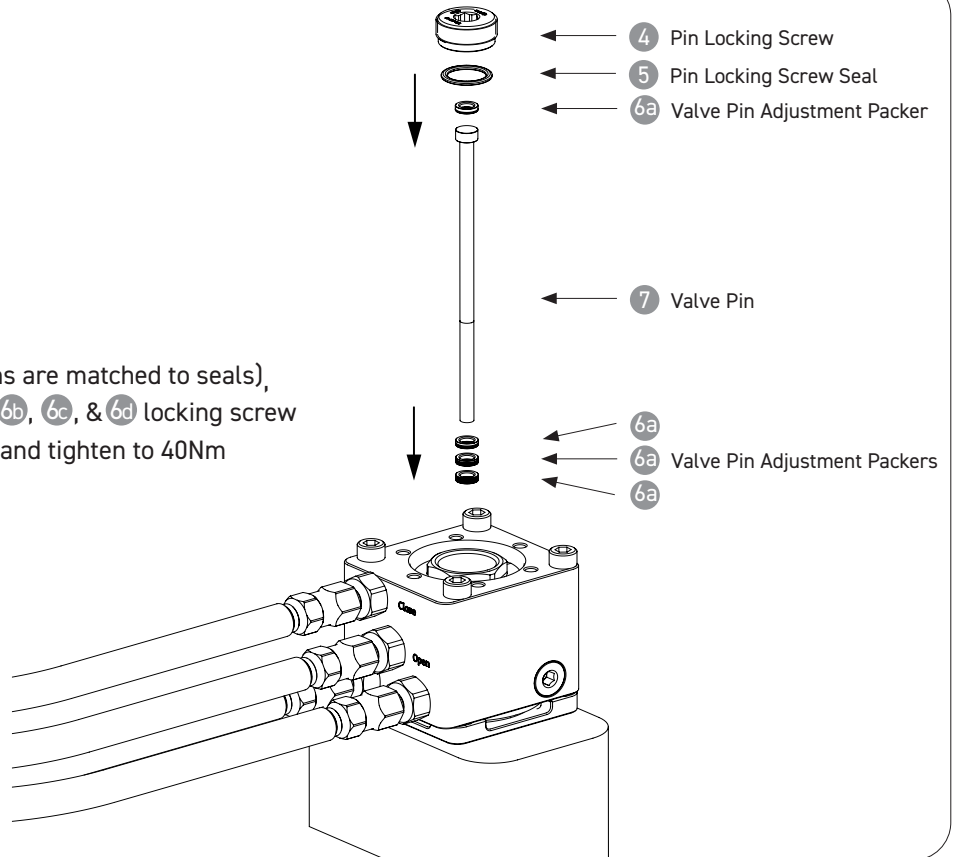
Move one or more **Valve Pin Adjustment**

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

PIN HEIGHT ADJUSTMENT CONT.....

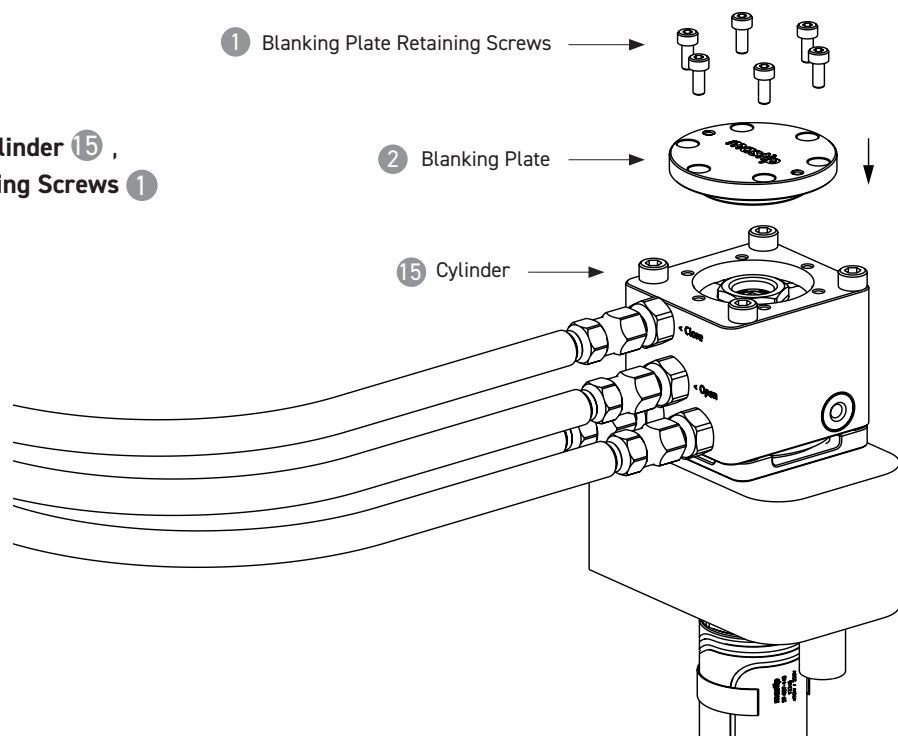
FIVE

Assemble **Valve Pin 7** (ensure pins are matched to seals), **Valve Pin Adjustment Packers 6a, 6b, 6c, & 6d** locking screw seal and 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.

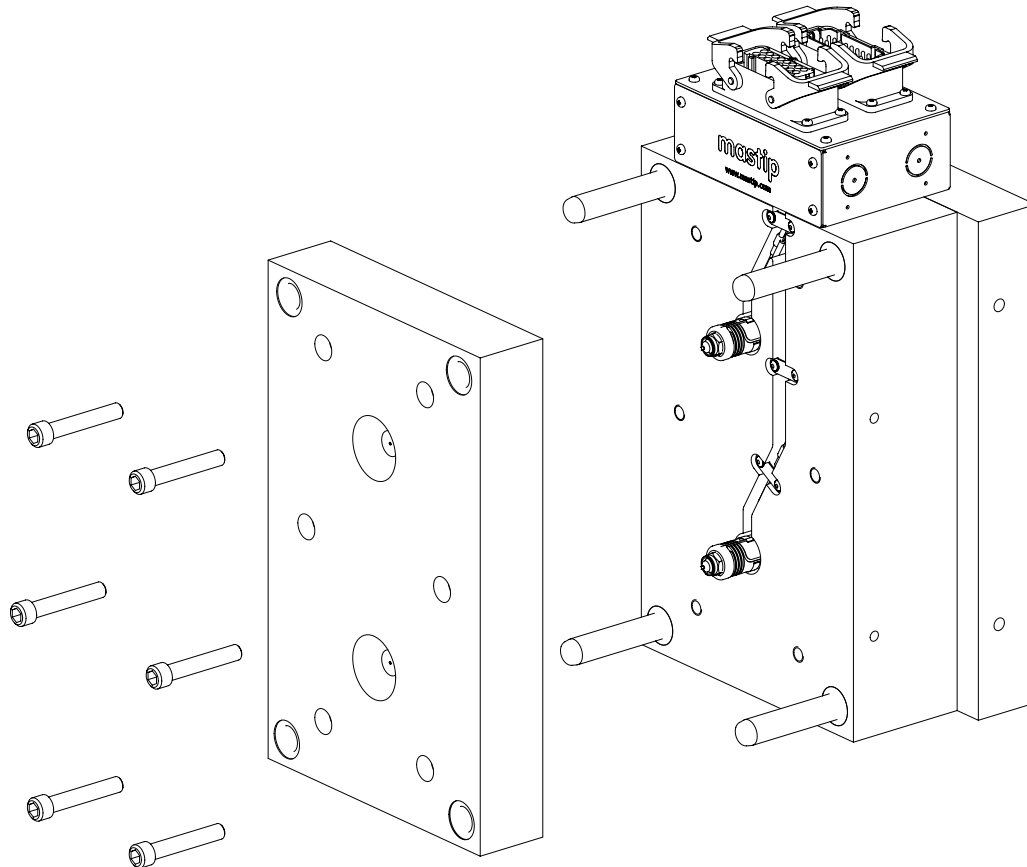


Valve Pin Guide Replacement

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

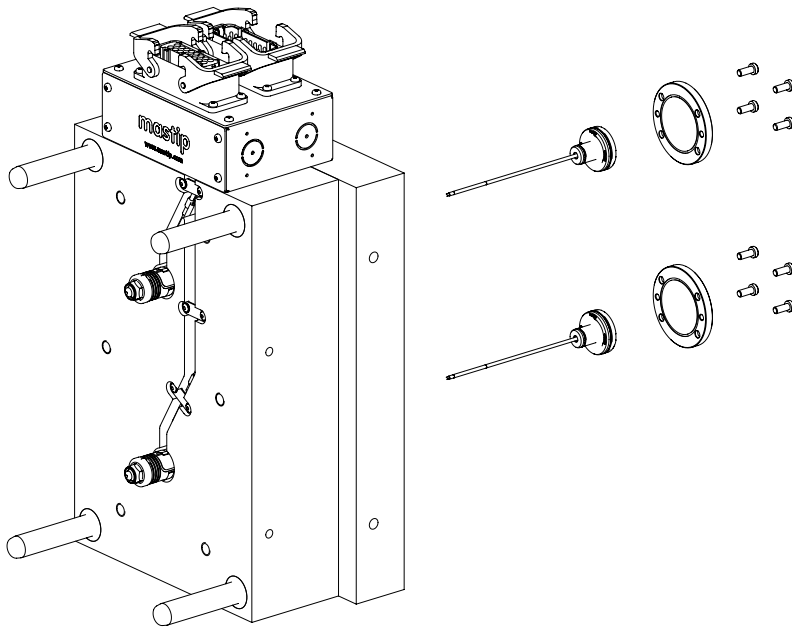
Remove the mould plates to expose the nozzle nut and tip

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

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

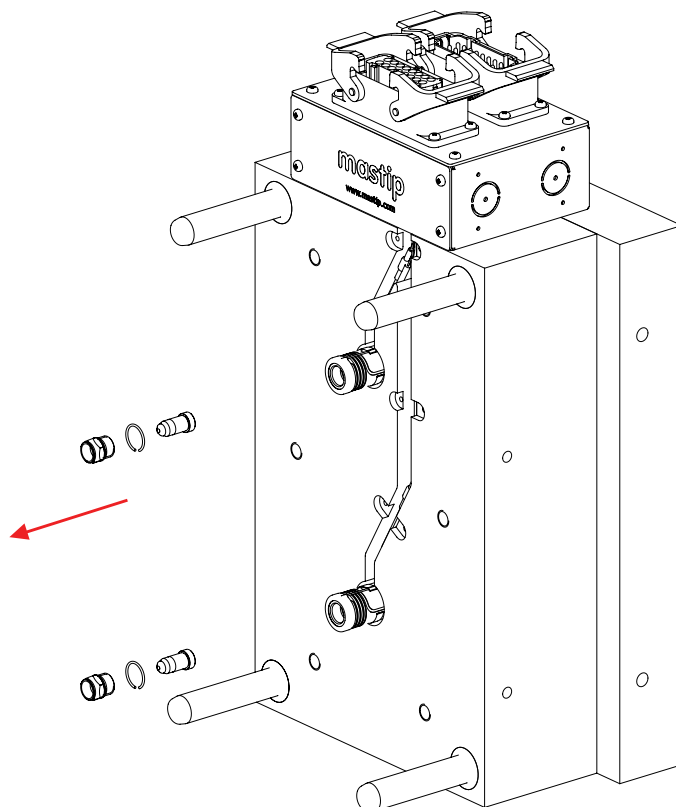
VALVE PIN GUIDE REPLACEMENT CONT.....

TWO



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

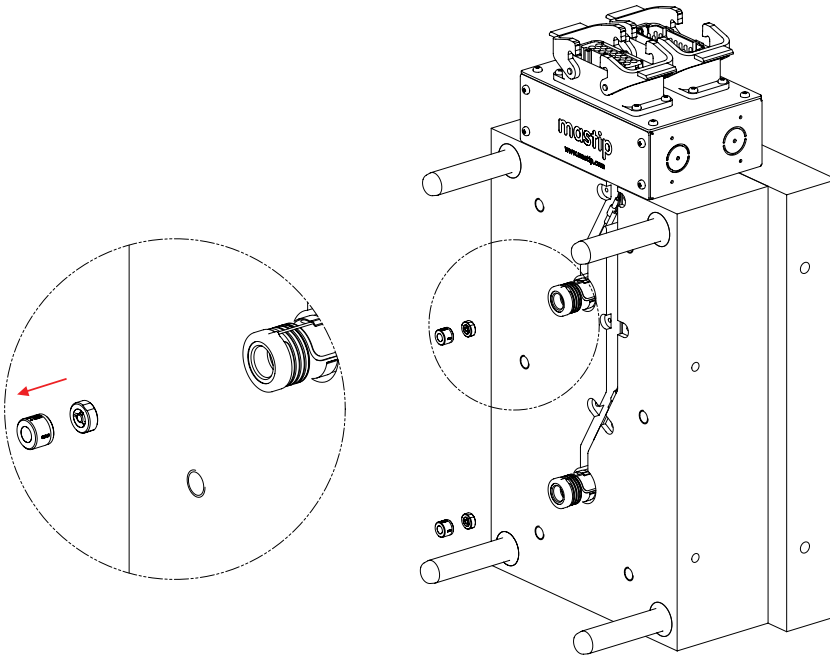
THREE



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

Notes



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