Techcon SYSTEMS TS5420 Precision Needle Valve User Guide

Contents

Techcon SYSTEMS TS5420 Precision Needle Valve

Product Information

Specifications

Model	Size	Weight	Fluid Inlet Port	Fluid Outlet Port	Air Inlet Port	Auxiliary Air Inlet Port	Minimum Air Pressure	Maximum Fluid Pressure	Operating Frequency	Mounting Port	Wetted Parts
TS5420	4.6” Length X 1.1” (117mm X 28.5mm)	0.3 lb (136 g)	” NPT female Luer Lock	10-32 UNF	10-32 UNF	70 psi (4.8bar)	300 psi (20.7bar)	Exceeds 400 cycles/min.			
TS5420SS	4.6” Length X 1.1” (117mm X 28.5mm)	0.5 lb (227 g)	” NPT female Luer Lock	10-32 UNF	10-32 UNF	70 psi (4.8bar)	300 psi (20.7bar)	Exceeds 400 cycles/min.			

Product Usage Instructions

Unpacking and Inspection

Carefully unpack the valve and examine the items contained in the carton. These will include:

- TS5420 or TS5420SS Needle Valve
- Other accessories or optional items (if applicable)

Description

The TS5420 Needle Valve is a normally closed, adjustable opening, needle, and seat valve. Inlet air pressure through port (1) retracts the needle assembly (2) from the seat (3) allowing fluid to flow from the valve fluid inlet (4) to the Luer lock outlet (5).
Relieving the input air pressure allows the spring (6) to return the needle to its position to close the material path.

Theory of Operation

The TS5420 Needle Valve operates as follows:

1. Inlet air pressure retracts the needle assembly from the seat.
2. Fluid flows from the valve fluid inlet to the Luer lock outlet.
3. Relieving the input air pressure allows the spring to close the material path.

Mounting Instructions

No specific mounting instructions are provided in the user manual.

Troubleshooting

Some common problems and their possible causes and corrections:

Problem	Possible Cause	Correction
No fluid flow	Fluid pressure too low	Increase fluid pressure
Inconsistent fluid flow	Operating pressure too low	Increase air pressure to 70 psi (4.8bar)
	Dispense tip clogged or dam aged	Replace tip
Fluid cured in the valve chamber		Clean valve thoroughly
The stroke adjustment closed		Open stroke adjustment counterclockwise
Fluid pressure fluctuating		Make sure fluid pressure is constant
The valve operating pressure is too lo w		Increased valve pressure to 70 psi (4.8 bar)
Valve open time is not consistent		Check to make sure the valve controller is providing a consistent output
Air trapped in fluid housing		Purge valve
Fluid drools after the valve closes, eve ntually stopping		Air trapped in fluid housing
		Purge valve
Steady drip		Dirty needle and seat
		Worn needle and seat
	Fluid pressure exceeds 300 psi (20.7bar)	Lower fluid pressure
	Valve re-assembled incorrect ly	Perform thorough cleaning
		Replace worn or damaged part
		Re-assemble the valve following instru ctions

Standard Accessories

Part Number	Description
7305XCON	Cleaning Gel, 30cc Syringe

Optional Accessories

Part Number	Description
TS918-46	4-Way Fluid Manifold Complete
TN00DKIT	Dispensing Tip Kit
9000-000-100	Sample Tip Kit
5420-SIT	Seal Insertion Tool

Fluid Fittings and Tubing

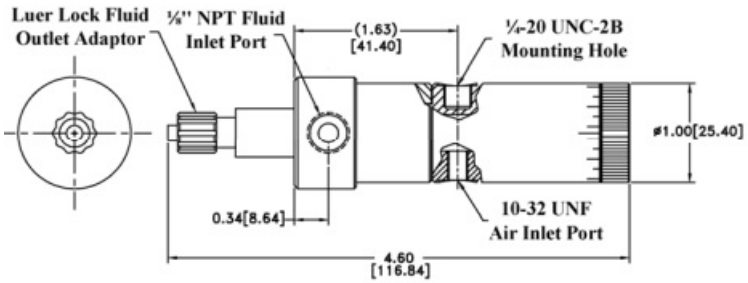
Part Number	Description
TSD1003-16	
TSD1002-17	
TSD1002-18	
TSD1002-38	
TSD1099-22	
TSD1099-23	
TSD1099-24	
TSD1099-25	
TSD1099-45	
TSD1099-46	
TSD126-360BPK	

Brackets

Part Number	Description
918-033-000	Productions Master Stand (Base & Support)
918-000-012	Rod Clamp Assembly
1212-000-008	6” (152.4mm) Threaded Mounting Rod

SPECIFICATIONS

	TS5420	TS5420SS
Size	4.6” Length X 1.1” (117mm X 28.5mm)	4.6” Length X 1.1” (117mm X 28.5mm)
Weight	0.3 lb (136g)	0.5 lb (227g)
Fluid Inlet Port	⅛” NPT female	⅛” NPT female
Fluid Outlet Port	Luer Lock	Luer Lock
Air Inlet Port	10-32 UNF	10-32 UNF
Auxiliary Air Inlet Port	10-32 UNF	10-32 UNF
Minimum Air Pressure	70 psi (4.8bar)	70 psi (4.8bar)
Maximum Fluid Pressure	300 psi (20.7bar)	300 psi (20.7bar)
Operating Frequency	Exceeds 400 cycles/min.	Exceeds 400 cycles/min.
Mounting Port	¼-20 UNC-2B	¼-20 UNC-2B
Wetted Parts	Type 303 SS, Al., Teflon®, EPR	Type 303 SS, Teflon®, Delrin®, EPR



Dimensions are in inches [mm]

Figure 1.0

UNPACKING AND INSPECTION

- Carefully unpack the valve and examine the items contained in the carton.

These will include:

- • Valve Assembly
- • Valve bracket and air hose

- • Sample tip kit and fluid line
- • User guide

DESCRIPTION

- The TS5420 Needle Valve is designed to dispense low to medium-viscosity material with very precise deposits over a wide range of shot and bead sizes, down to a fraction of a microliter. An internal spring return makes the valve fully adaptable for use with
- Techcon Systems time/pressure controllers. A short opening stroke provides an extremely fast, positive shut-off. An external stroke control adjustment makes it easy for the operator to fine-tune shot sizes. The TS5420's compact design allows for mounting flexibility and easy integration into automated applications.

THEORY OF OPERATION

- The TS5420 Needle Valve is a normally closed, adjustable opening, needle, and seat valve. Inlet air pressure through port (1) retracts the needle assembly (2) from the seat (3) allowing fluid to flow from the valve fluid inlet (4) to the Luer lock outlet (5).
- Relieving the input air pressure allows the spring (6) to return the needle to its position to close the material path.

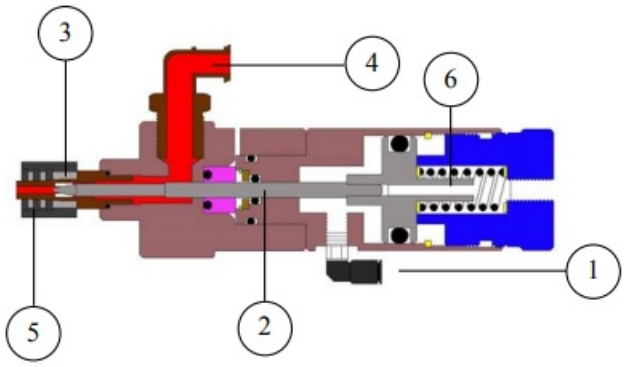


Figure 2.0

SETUP INSTRUCTIONS

Refer to Figure 3.0

Note: This installation uses Luer lock adapters shipped with the valve. Any approved material line with ⅛" NPT connections will work.

1. If desired, mount the valve to the bracket included.
2. Connect fluid feed line to valve inlet port (1).
3. Install valve actuating air hose to air inlet port (2).
4. Connect the valve air hose to an approved valve controller, such as the TS500R.
5. Set the fluid reservoir pressure. Do not exceed 300 psi (20.7 bar).
6. Make sure all connections are tight.
7. Place a container under the valve outlet and activate the valve until the fluid flows steadily.
8. Attach the appropriate dispense tip to the Luer lock outlet fitting (3).

The amount of fluid that flows through the valve is determined by:

- Flow control adjustment: Turn the end cap counterclockwise to increase the material flow rate.
- Length of actuation, set at controller (valve open time).
- Fluid reservoir pressure
- Dispense tip size

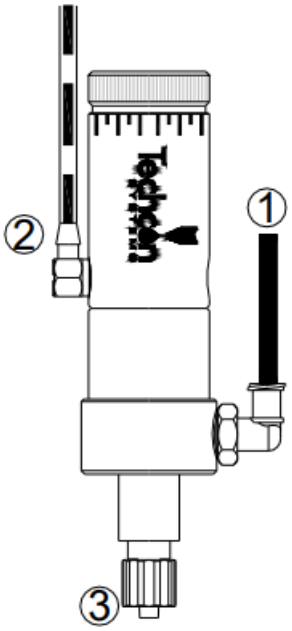


Figure 3.0

TYPICAL SYSTEM SET-UP

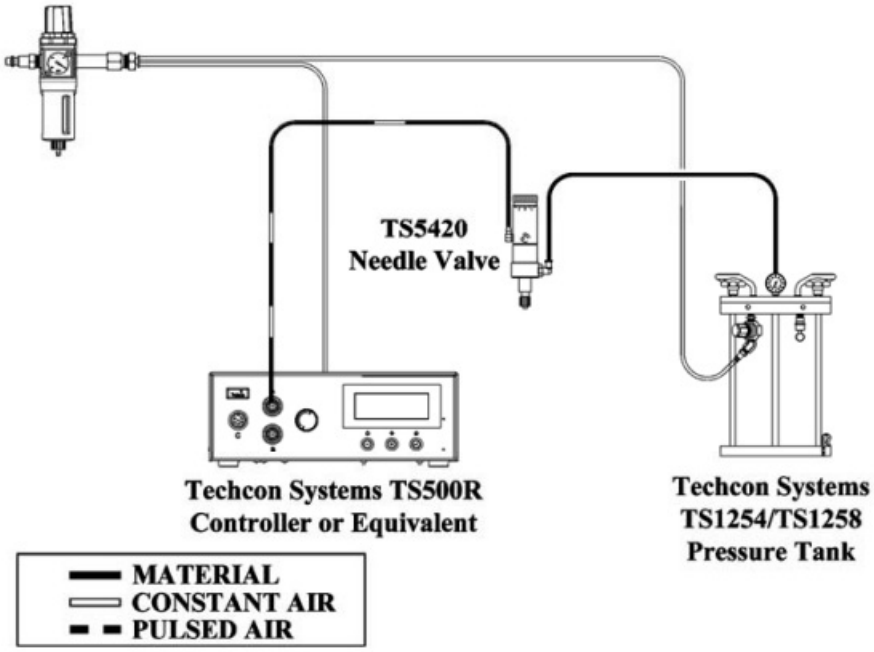


Figure 4.0

MAINTENANCE AND CLEANING:

- Tool required: 5/8” open-end wrench; Snap ring pliers, o-ring removal tool (P/N TSD1597-7).
- Normally, purging the valve with appropriate flush material or solvent after use is sufficient for cleaning. However some material may cause a buildup in the valve chamber, in this case periodic and thorough cleaning will be required.

NOTE:

- Make sure the fluid pressure is released before the valve is disassembled
- **To replace seals, please order seal kit part number:** 5420-SEAL KIT
- **To repair a valve, please order valve kit part number:** 5420-VALVEKIT

Thorough Cleaning

- Refer to Figure **5.0**

1. Release fluid pressure.
2. Disconnect the fluid line and remove the fluid inlet fitting.
3. Disconnect valve air hose.
4. Turn the stroke control knob (15) two turns counterclockwise from the closed position.
5. Hold the fluid housing (8) and rotate the air cylinder (2) counterclockwise. When completely un-threaded, pull the two valve segments straight apart to separate.
6. Inspect the o-ring (6), and replace the o-ring if damage is found.
7. Remove the cup seal (7), and replace the seal if damaged is found.
8. Remove the Luer adapter assembly (9).
9. Clean the fluid housing (8), needle/piston assembly (5), and Luer adapter assembly (9).
    - **NOTE:** Avoid using sharp probes for cleaning. Any nicks or scratches on the seal or the surfaces of the needle/piston assembly may cause leakage.
10. Insert cup seal (7) into fluid housing (8) using the 5420-SIT insertion tool. Make sure the o-ring side is facing down.
11. Reinstall the Luer adapter assembly (9) to fluid housing (8).
12. Lubricate o-ring (6) with Bimba HT-99, or equivalent
13. Thread the air cylinder/needle assembly into the fluid housing.
14. Make sure not to cross-thread.

Nozzle Seat Replacement (refer to figure 6.0)

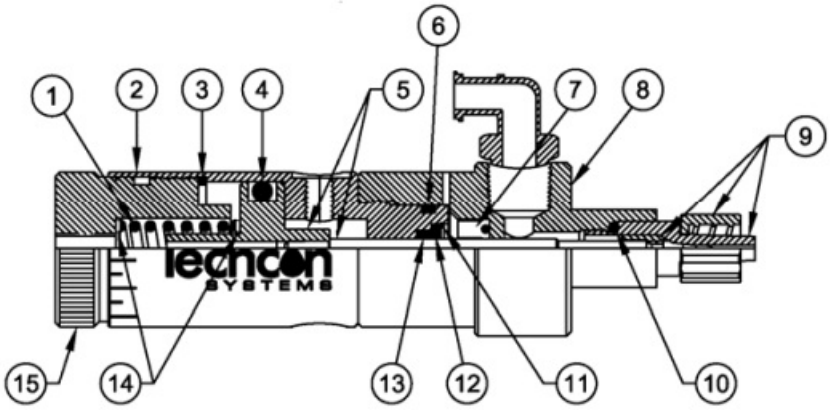
1. Insert the thumb screw inside the nozzle (16) and rotate clockwise to attach to the seat (17).
2. Secure the nozzle in a “soft jaw” vise and then pull the thumb screw, with the seat attached, straight out.
3. Install the new seat on the thumb screw and then insert the thumb crew straight into the nozzle. To ensure proper seat alignment, it is recommended that the seat installation is done on an Arbor Press.

To Replace Seal in Air Cylinder

1. Hold the fluid housing (8) and rotate the air cylinder (2) counterclockwise. When completely un-threaded, pull

the two valve segments straight apart to separate.

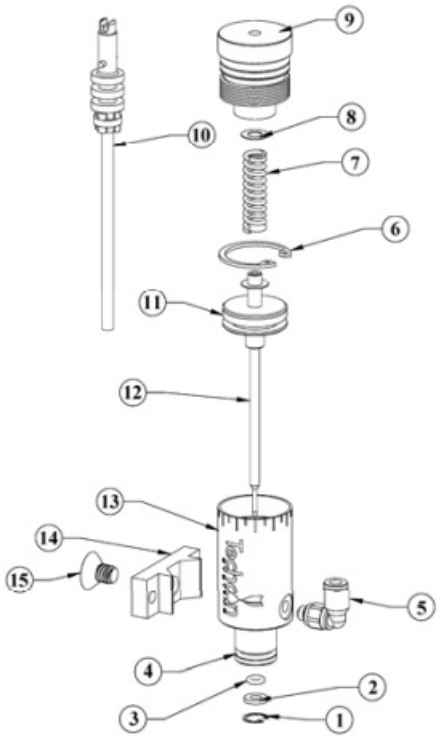
2. Remove the stroke control knob (15) by rotating it in a counterclockwise direction.
3. Remove compression spring (1).
4. Using the snap ring pliers, remove the retaining ring (3).
5. Remove Mylar washers (14).
6. Pull the needle/piston assembly (5) straight out from the air cylinder (2).
7. Using the snap ring pliers, remove the retaining ring (11).
8. Remove the nylon washer (12) from the air cylinder.
9. Using the o-ring removal tool, remove the o-ring (13).
10. Replace all o-rings if necessary.
11. Lubricate all o-rings with Bimba HT-99, or equivalent.
12. Reinstall o-ring (13).
13. Reinstall the nylon washer (12) and secure it with a retaining ring (11).
14. Thread the air cylinder (2) into fluid housing (8). Make sure not to cross-thread.
15. Reinstall needle/piston assembly (5) and secure with retaining ring (3).
16. Reinstall the first Mylar washer (14) on the needle/piston assembly (5).
17. Reinstall compression spring (1) into air cylinder (2).
18. Reinstall the second Mylar washer (14) in the stroke control knob (15).
19. Reinstall the stroke control knob (15).



SPARE PARTS

Valve Rear Section

Recommended lubricant: All o-rings & seals must be lubricated with Bimba HT-99 or equivalent.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	TSD1120-2	Retaining Ring, Small	1
2	TSD1109-45	Nylon Washer	1
3	TD1400-006A	O-Ring, Buna	1
4	TSD1400-013A	O-Ring, Buna	1
5	TSD1003-20	Air Fitting, 4mm, Elbow	1
6	TSD1120-15	Retaining Ring, Large	1
7	TSD1150-34	Spring	1
8	TSD1109-43	Mylar Washer	2
9	5520-000-007	End Cap, For TS5420	1
9*	T1000599	End Cap, For TS5420SS	1
10	A0100478	Air Hose/Connector Assembly, 4mm	1
11	TSD1400-208A	Piston O-Ring, Buna	1
12	5520-000-010	Needle/Piston Assembly	1
13	5520-000-001	Air Cylinder, For TS5420	1
13*	T1000600	Air Cylinder, For TS5420SS	1
14	918-000-048	Mounting Bracket	1
15	TSD1106-36	Mounting Screw	1

Valve Front Section

Recommended lubricant: All O-Rings & seals must be lubricated with Bimba HT-99, or equivalent, except for TSD400-70, which must remain dry.

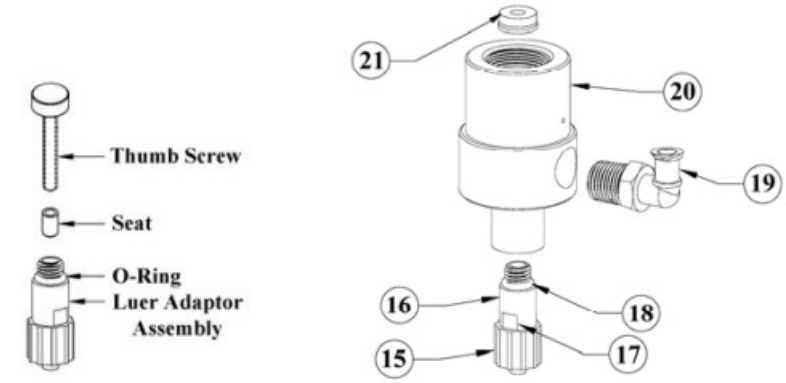
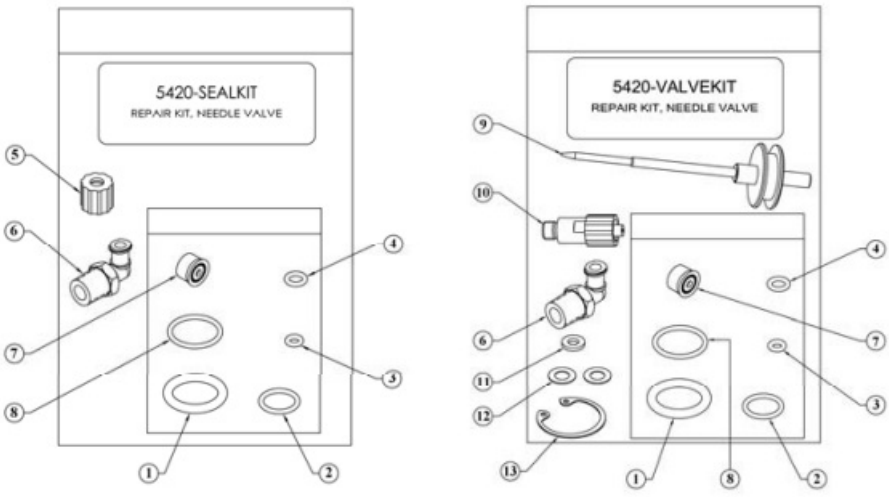


Figure 6.0

ITEM	PART NUMBER	DESCRIPTION	QTY
15	TSD931-44	Luer Lock Collar	1
16	5420-000-007	Luer Adaptor, Inc. Collar/Seat	1
17	T1000598	Nozzle Seat	1
18	TSD1400-008A	Luer Adaptor O-Ring, Buna	1
19	TSD931-75	Luer Lock Adaptor, Elbow	1
20	5420-000-002	Body, For TS5420	1
20*	5420-000-008	Body, For TS5420SS	1
21	TSD400-70	U-Cup Seal	1
Above	TSD1113-28	Thumb Screw	1

REPAIR KITS



These kits are for both variations of Techcon Systems Needle Valve

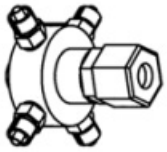
ITEM	PART NUMBER	DESCRIPTION	QTY
1	TSD1400-208A	Piston O-Ring, Buna	1
2	TSD1400-013A	O-Ring, Buna	1
3	TSD1400-006A	O-Ring, Buna	1
4	TSD1400-008A	O-Ring, Buna	1
5	TSD931-44	Luer Collar	1
6	TSD931-75	Luer Lock Adaptor, Elbow	1
7	TSD400-70	U-Cup Seal	1
8	TSD1400-016A	O-Ring, Buna	1
9	5520-000-010	Needle/Piston Assembly	1
10	5420-000-007	Luer Lock Outlet Adaptor, With Seat	1
11	TSD1109-45	Nylon Washer	1
12	TSD1109-43	Mylar Washer	2
13	TSD1120-15	Retaining Ring, Large	1

STANDARD ACCESSORIES

PART NUMBER	DESCRIPTION
7305XCON	Cleaning Gel, 30cc Syringe

OPTIONAL ACCESSORIES

PART NUMBER	DESCRIPTION
TS918-46	4-Way Fluid Manifold
TN00DKIT	Complete Dispensing Tip Kit
9000-000-100	Sample Tip Kit
5420-SIT	Seal Insertion Tool



FLUID FITTINGS AND TUBING

PART NUMBER	DESCRIPTION
TSD1003-16	⅛” NPT to ¼” O.D. Tube, 90° Elbow
TSD1002-17	⅛” NPT to ⅜” O.D. Tube
TSD1002-18	⅛” NPT to ¼” O.D. Tube
TSD1002-38	¼” NPT to ¼” O.D. Tube
TSD1099-22	⅜” O.D. X ¼” I.D. Tube, Black, Polyethylene
TSD1099-23	⅜” O.D. X ¼” I.D. Tube, Clear, Polyethylene
TSD1099-24	¼” O.D. X ⅛” I.D. Tube, Clear, Polyethylene
TSD1099-25	¼” O.D. X ⅛” I.D. Tube, Black, Polyethylene
TSD1099-45	6mm O.D. X 4mm I.D, Clear, Polyethylene
TSD1099-46	6mm O.D. X 4mm I.D, Black, Polyethylene
TSD126-360BPK	Luer Lock Tubing, 60” (1524mm), Black

BRACKETS

PART NUMBER	DESCRIPTION
918-033-000	Productions Master Stand (Base & Support)
918-000-012	Rod Clamp Assembly
1212-000-008	6” (152.4mm) Threaded Mounting Rod

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTION
No fluid flow	Fluid pressure too low	Increase fluid pressure
	Operating pressure too low	Increase air pressure to 70 psi (4.8bar)
	Dispense tip clogged or damaged	Replace tip
	Fluid cured in the valve chamber	Clean valve thoroughly
	The stroke adjustment closed	Open stroke adjustment counterclockwise
Inconsistent fluid flow	Fluid pressure fluctuating	Make sure fluid pressure is constant
	The valve operating pressure is too low	Increased valve pressure to 70 psi (4.8bar)
	Valve open time is not consistent	Check to make sure the valve controller is providing a consistent output
	Air trapped in fluid housing	Purge valve
Fluid drools after the valve closes, eventually stopping	Air trapped in fluid housing	Purge valve
Steady drip	Dirty needle and seat	Perform thorough cleaning
	Worn needle and seat	Replace worn or damaged part
	Fluid pressure exceeds 300 psi (20.7bar)	Lower fluid pressure
	Valve re-assembled incorrectly	Re-assemble the valve following instructions

LIMITED WARRANTY

- The manufacturer warrants this product to the original purchaser for one (1) year from the date of purchase to be free from defects in material and workmanship, but not against damages by misuse, negligence, accident, faulty installations and instructions. The manufacturer will repair or replace (at the factory's option), free of charge, any component of the equipment thus found to be defective, on return of the component, "PREPAID" to the factory during the warranty period. In no event shall any liability or obligation of the Manufacturer arising from this warranty exceed the purchase price of the equipment. This warranty is only valid if the defective product is returned as a complete assembly without physical damage. The Manufacturer's liability, as stated herein, cannot be altered or enlarged except by a written statement signed by an officer of the company. In no event shall the Manufacturer be liable for consequential or incidental damages. A return authorization is

required from Techcon Systems prior to shipping a defective unit to the factory.

- Manufacturer reserves the right to make engineering product modifications without notice.
- All returns must be issued with a Returns Authorization number, before return. Send warranty returns to:
- Americas and Asia ————————————————-
- OK International ————————————————-
- Garden Grove Division ————————————————-
- 12151 Monarch Street ————————————————-
- Garden Grove, Ca 92841 ————————————————-
- Europe ————————————————-
- OK International ————————————————-
- Eagle Close ————————————————-
- Chandler’s Ford Ind Est ————————————————-
- Eastleigh ————————————————-
- Hampshire ————————————————-
- SO53 4NF ————————————————-
- United Kingdom ————————————————-
- Delrin® and Teflon® is a registered trademark of E.I. DuPont.

Documents / Resources

	Techcon SYSTEMS TS5420 Precision Needle Valve [pdf] User Guide TS5420, TS5420SS, TS5420 Precision Needle Valve, Precision Needle Valve, Needle Valve, Valve

References

- User Manual