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Quick and easy feed screw replacement while maintaining high precision output

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## 1. SPECIFICATIONS

	<b>TS7000IMP Series</b>	<b>TS7000IMP “E” Series</b>
Size	170.18 mm x 93.98 mm 6.7" x 3.7"	171.45 mm x 93.98 mm 6.75" x 3.7"
Weight	438 g 0.96 lb	438 g 0.96 lb
Fluid Inlet Port	Female Luer lock	Female Luer lock
Fluid Outlet Port	Male Luer Lock	Male Luer Lock
Maximum Fluid Pressure	30 psi (2.07 bar)	30 psi (2.07 bar)
Operating Frequency	Exceeds 300 cycles/min.	Exceeds 300 cycles/min.
Mounting	1" (25.4 mm) Channel	1" (25.4 mm) Channel
Wetted Parts	303 SS, UHMWPE, Hardened Tool Steel, Nylon®	303 SS, UHMWPE, Hardened Tool Steel, Nylon®
Viscosity Range	30,000 cps – 1,300,000 cps	30,000 cps – 1,300,000 cps

### Encoder Options

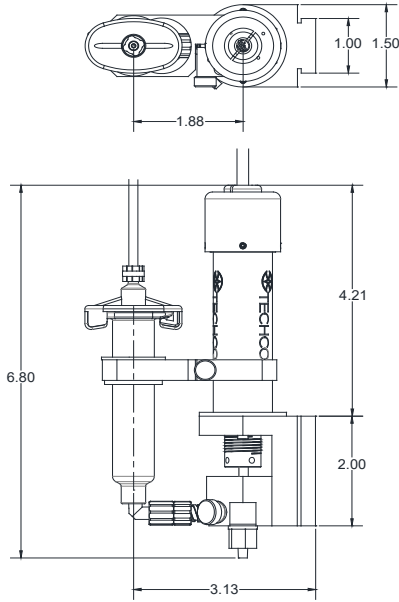
Techcon offers the TS7000IMP Series with an optional encoder fitted to the DC motor.

<b>PART NUMBER</b>	<b>DESCRIPTION</b>
TS7000E-8-DCX	Encoded IMP Valve With 8 pitch feed screw
TS7000E-HO-DCX	Encoded IMP Valve With 8HO pitch feed screw
TS7000E-16-DCX	Encoded IMP Valve With 16 pitch feed screw
TS7000E-32-DCX	Encoded IMP Valve With 32 pitch feed screw

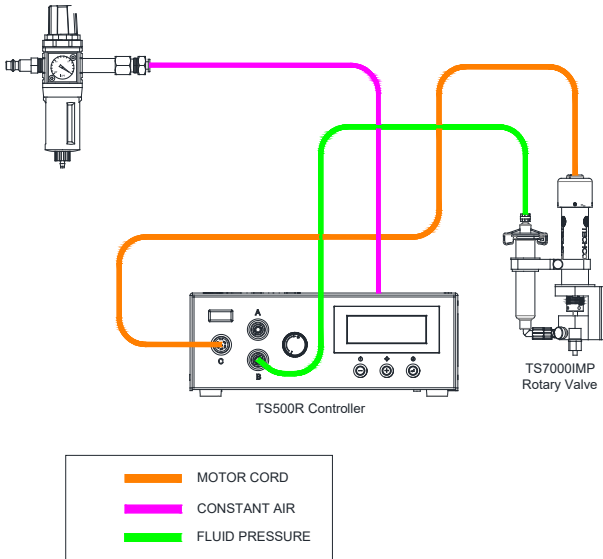
For spare parts, technical drawings, dimensional drawings, wiring diagrams or encoder information, relating to the encoder valve option, please [contact Techcon](#).

## 2. DIMENSIONS AND TYPICAL SETUP

**Figure 1.0**



### Encoder and Non-Encoder Option



**Figure 2.0**

### 3. UNPACKING AND INSPECTION

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

These will include:

- TS700IMP valve assembly with optional TS-SS Luer cap
- Valve bracket and syringe bracket
- Sample tip kit
- 30/55 cc receiver head assembly
- User guide

Inspect the unit for any damage which may have occurred in transit. If such damage has occurred, notify the carrier at once. Claim for damage must be made by the consignee to the carrier and should be reported to the manufacturer.

### 4. DESCRIPTION

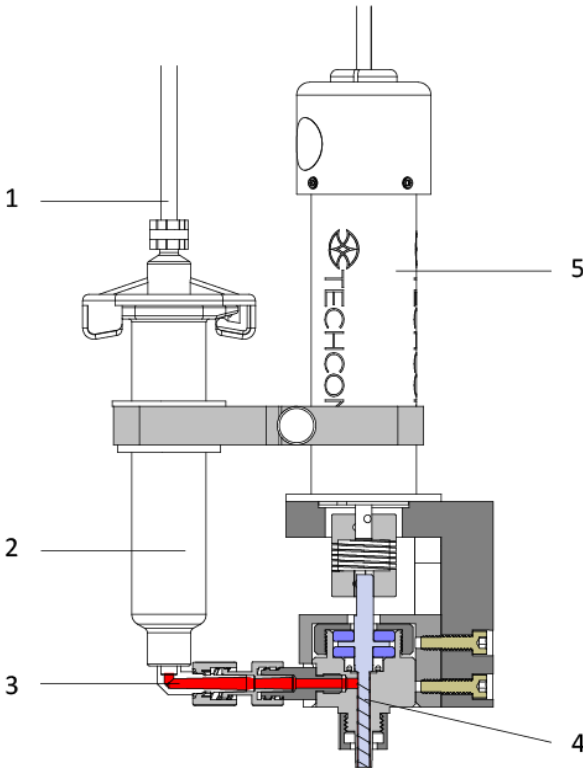
The TS7000IMP Series Rotary Auger Valves are the latest addition to the Techcon Rotary Microvalve family. The valve uses a feed screw (auger) to dispense fluid with a rotary displacement action, allowing ultra-precise control of the dispensing process.

The valve's modular design allows quick and easy replacement of feed screw/chamber cartridge without the need of removing the main valve from the machine. In addition, the valve can be interchanged to use with TS5000DMP feed screw inserts.

The TS7000IMP Series valve is available with 4 choices of feed screw sizes (32-pitch, 16-pitch, 8-pitch and high output 8-pitch), all made of precision hardened tool steel. Encoder motor versions are available for applications requiring closed-loop motor control with encoder feedback.

## 5. THEORY OF OPERATION (refer to figure 3.0)

The TS7000IMP Series Rotary Auger Valve dispenses fluid with a rotary displacement action, using a rotary feed screw principle. Fluid is held in a feed reservoir (2) under a positive head of air pressure, up to 30 psi (2.07bar), depending upon the viscosity of the fluid. This positive air pressure, supplied by the air line (1), forces the fluid out of the barrel (2), into the fluid feed path (3), then to the feed screw/chamber assembly (4). Fluid flows from this point (4) to the dispense tip outlet, and is controlled by the feed screw rotation in the feed direction. The feed screw is driven by the DC motor (5). Applying a DC voltage signal to the DC motor (5) will rotate the feed screw, and the fluid will be forced out the dispense tip. The actual fluid deposited is dependent upon adhesion of the dispensed fluid to the substrate. Shearing of the fluid is achieved by reverse Z-motion (tip retraction). When the motor stops, the unit remains in position for a fraction of a second (dwell) to allow the last drop of fluid to flow out of the dispense tip. After the dwell period, the automation equipment moves the valve to the next position.



**Figure 3.0**

## 6. SET-UP INSTRUCTIONS

### Mechanical Mounting:

Normally, the TS7000IMP Series valve is used on an automated XYZ table, with full motion control in the three planes. It is very important that the valve is mounted on the Z-axis gantry, in a secure manner, that will not allow loosening during dispense operation. The Z-axis must move in a precise and repeatable motion for successful dispensing.

The provided mounting bracket, or customer supplied bracket, must be attached to the Z-axis in a manner that will provide the valve perpendicular travel to the horizontal plane of the surface on which the fluid will be dispensed. The mounting should provide a means of accurately adjusting the distance between the dispense tip and the substrate surface, such as a touchdown sensing device or a fixed distance standoff.

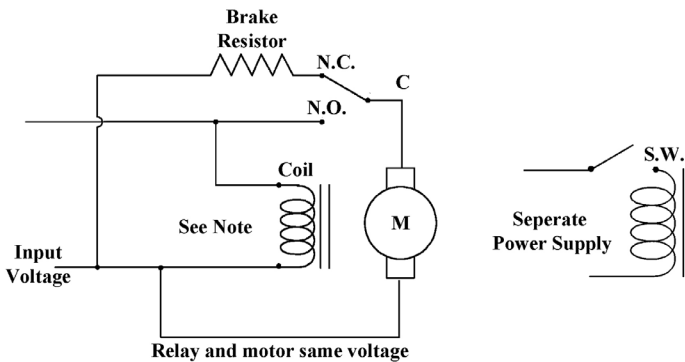
### Air Connection:

Filtered air supply must be precisely regulated and should be set between 1-30 psi (0.07 to 2.07 bar). The air supply is not used as the main dispensing force. It is only required to move fluid to the feed screw chamber.

### Electrical Connection:

The TS7000IMP Series valve requires an electrical connection of two wires for the DC motor. The motor lead wires are 24" (609.60 mm) in length. The black lead wire should be connected to the negative or neutral lead from the motor control voltage source. To verify the connection, check the rotation direction of the feed screw. When correctly connected, a positive voltage signal will drive the feed screw in a counterclockwise direction when viewed from the dispense tip end.

The recommended controller for the TS7000IMP Series valve is the [TS577R](#). If another controller is used, make sure the control voltage signal is precisely controlled. The signal should be from a regulated power supply and should be shunted to positive motor stop. Figure 4.0 shows a simple braking circuit diagram:



**NOTE: Relay coil can be connected to separate control**

**Figure 4.0**

## 7. DETERMINING DISPENSING OUTPUT

### A. DC Motor Voltage Level:

Voltage controls the motor speed (RPM). Increased voltage produces increased motor speed, and decreased voltage produces decreased motor speed.

### B. Motor Shaft Speed:

Motor gear ratio configuration determines final shaft speed. High RPM = High Output. Low RPM = Low Output.

### C. Feed Screw Pitch:

Rate of fluid dispensed is determined by the pitch of the feed screw. A high pitch number will produce a low dispense rate, and a low pitch number will produce a higher dispense rate. A high pitch number will provide improved accuracy over a low pitch number.

### D. Dispense Tip:

The size of the dot diameter or bead width is determined by the dispense tip. A low gauge number (larger I.D.) will dispense a large diameter dot or a wide bead. A high gauge number (smaller I.D.) will dispense a smaller diameter dot or a narrower bead. Dispense tip sizes smaller than 25 gauge and longer than ½" (12.7 mm) are not recommended to use with solder paste. A normal rule of thumb to choose the dispense tip size is that the dot size will equal 1.5 times the internal diameter of the dispense tip. For setting the dispense tip distance from the substrate, the normal rule of thumb is to set the distance at ½ the internal diameter of the tip being used.

### E. Fluid Feed Pressure:

The fluid feed pressure does affect the amount of fluid dispensed through the valve. Optimum feed pressure is dependent upon the viscosity of the fluid being dispensed. Only in unusual circumstances should the feed pressure exceed 30 psi (2.07 bar).

### F. Dispense Fluid:

The viscosity of the dispense fluid along with the particulate additives to the dispense fluid will also determine the dispense rate. The ability to dispense may be directly related to the fluid formulation.

### G. Dispense Cut Off:

The best method of stopping fluid flow at the end of the cycle is to short the motor (grounding the DC voltage signal through a current limiting resistor). This method provides a complete rotational brake of the motor at the shut off point. Another method of stopping fluid flow is to reverse the motor rotation by reversing the DC voltage signal. This can be described as “suck-back” action. In both cases, a no-drip dispensing action can be achieved. Turning off the fluid feed pressure when the valve is not dispensing will prevent dripping and oozing, with fluids at the lower end of the TS7000IMP viscosity range.

### H. Fluid Condition:

The physical condition of the dispense fluid is very important to successful dispensing. There are a number of conditions that can prevent continuous and consistent dispensing such as:

1. **Freshness:** Old fluid (most fluids have a recommended shelf life) leads to erratic dispensing and frequent clogging, especially with solder paste. Make sure to check the fluid shelf life before start dispensing.
2. **Separation:** Fluid with a high content of solid particles, such as solder paste, tends to separate at high pressure. If the dispense fluid starts to separate, replace it with new fresh fluid.
3. **Particle sizing:** Do not attempt to dispense solder paste with particle sizes larger than 75 microns (-200+325 mesh size).

## 8. CHANGING THE CARTRIDGE ASSEMBLY:

The cartridge assembly can be removed and re-installed while the valve is on the machine. Follow instructions and refer to Figure 6.0 to change the cartridge assembly.

1. Release fluid pressure.
2. Remove barrel of dispense fluid from the valve.
3. Grasp the cartridge feed screw assembly (11) at the fluid fitting inlet, then remove the thumb screw (10) completely out of the valve housing (9).
4. If the set screw on the coupling (5) is tightened, use a hex wrench to loosen it.
5. Pull the cartridge/feed screw assembly out of the valve housing (9).

### Re-installing the Cartridge assembly

The cartridge assembly can be installed in three different locations: left side, center, and right side positions.

1. Insert the cartridge assembly (11) into the valve housing (9), ensuring the flat surface of the feed screw shaft aligns with the coupling's (5) "D" shape hole. Note: The fluid inlet fitting can be installed on the left side, center, or right side on the valve housing (9).
2. If desired, tighten the set screw on the coupling (5) to prevent possible back lash.
3. Install the thumb screw (10).

### DMP VALVE CHANGEOVER OPTION

The TS7000IMP Series valve has the interchangeability feature that allows users to replace valve housing with the Disposable Material Path (DMP) housing to transform the valve into the DMP configuration.

Required parts:

7000-DMPBKIT	DMP Bracket Kit (Sold separately)
A0100235	DMP body (Sold separately).

Refer to figure 6.0 and instructions below for replacement procedures.

1. Remove the cartridge assembly (11).
2. Remove the two bracket mounting screws (7) and pull the valve housing (9) away from the main housing (8).
3. Install a square drive adapter (included in the 7000-DMPBKIT) to the flexible coupling (5) and tighten the set screw.
4. Install the DMP bracket (included in the 7000-DMPBKIT) into the main housing (8).
5. Install the DMP valve housing to the valve bracket.

## 9. MAINTENANCE AND CLEANING:

### Valve Purging:

Purging the valve with dispensing conditioner (10 cc = 7105XCON or 30 cc 7305XCON) between shifts or after every eight hours of dispensing is recommended. The conditioner cleans any fluid residue from the fluid path and conditions the valve for future use.

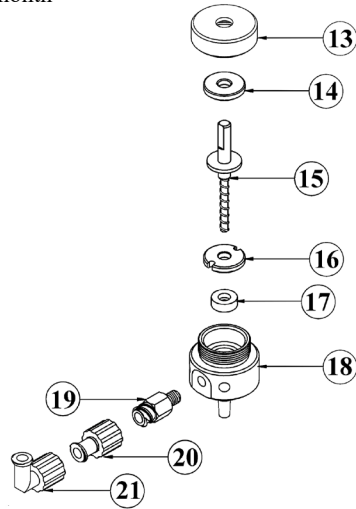
1. Attach a syringe barrel of dispensing conditioner to the valve inlet.
2. Apply 8 psi (0.55 bar) pressure onto the syringe barrel and allow the pressure to push the conditioner through the valve for 2 minutes. Do not apply more than 10 psi (0.69 bar) on the conditioner when priming, as this may cause compressed air pockets in the valve chamber.
3. Turn on the motor and let it run until a steady stream of conditioner is being dispensed.
4. Turn off the motor and install the appropriate dispense tip to the valve outlet. Do not over tighten the dispense tip.
5. Turn on the motor and let it run until a steady stream of fluid is being dispensed.

## Thorough Cleaning (refer to figure 5.0):

Thorough cleaning procedures should be done whenever the following occur:

- Dispense fluid is changed to a different type
- Dispense fluid starts to cure in the valve
- Valve has been dispensing for one month
- Dispense tip clogs frequently

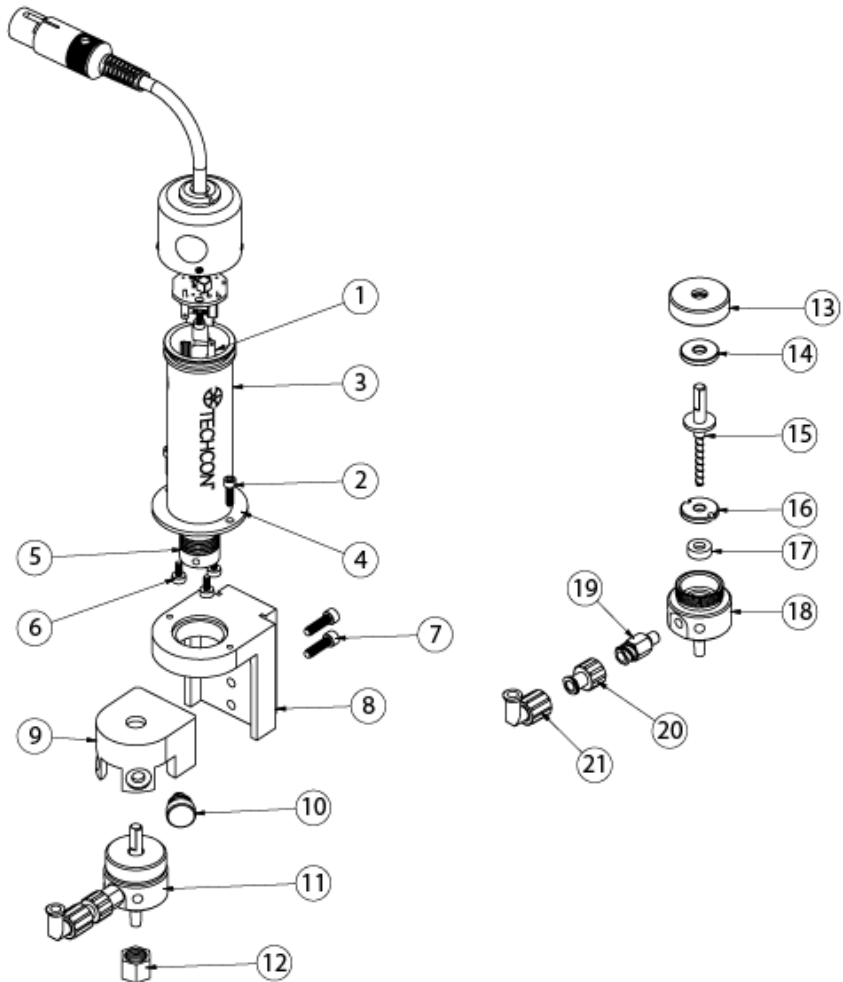
**Figure 5.0**



1. Follow steps 1- 5 in Section 9 “Maintenance and Cleaning - Valve Purging.”
2. Follow steps 1- 5 in Section 8 “Changing the Cartridge Assembly.”
3. Remove the fluid inlet fitting (19) along with the luer lock adapter (20) and luer lock elbow fitting (21) from the cartridge (18).
4. Remove the cartridge cover (13) by turning it counterclockwise
5. Pull the feed screw (15) straight out of the cartridge (18), ensuring not to lose the top thrust washer (14).
6. Using the tweezers, provided in the cleaning kit, remove the bottom thrust washer (16).
7. Using a cotton swap, carefully remove the seal (17) from the cartridge (18).
8. Clean all parts using the soft cleaning brush with any suitable solvent.
9. Inspect parts for wear or damage, and replace if necessary.
10. Re-install the seal (17) into the cartridge body (18), ensuring that the spring side is facing down.
11. Fully press the bottom thrust washer (16) into the cartridge body (18).
12. Insert the feed screw (15) into the cartridge body (18), ensuring the seal (17) is not damaged.
13. Install the top thrust washer (14) onto the feed screw flange.
14. Tighten the cartridge cover (13).
15. Install the fluid inlet fittings (19, 20, and 21).
16. Install the reassembled cartridge assembly into valve housing.

17. Purge valve as per steps 1- 5 in Section 9 “Maintenance and Cleaning - Valve Purging.”

## 10. SPARE PARTS



**Figure 6.0**

ITEM	PART NUMBER	DESCRIPTION	QTY
1*	TSD1412-61	Motor, 14W, No Encoder	1
1*	TSD1412-62	Motor, 14W, With Encoder	1
2	2800-0423	Mounting Plate Screw	2
3	5000-000-346	Motor Sleeve	1
4	7090-0310	Motor Mounting Plate	1
5	7090-0050	Coupling	1
6	2800-0569	Mounting Plate Screw	3
7	2800-0213	Main Housing Screw	2
8	7090-0300	Main Housing	1
9	7090-0020	Cartridge Housing	1
10	7090-0040	Thumb Screw	1
11*	7090-9140	Cartridge Assembly, 32P	1
11*	7090-9040	Cartridge Assembly, 16P	1
11*	7090-9030	Cartridge Assembly, 8P	1
11*	7090-9050	Cartridge Assembly, 8P High Output	1
12*	7090-0030	Locking Cap, TE and TT Tips (STD)	1
12*	7090-0170	Locking Cap, TS-SS Tips	1
12*	5440-000-004	Locking Cap, TE Tips, Full Block	1
13	7090-0090	Cartridge Assembly Cover	1
14	7090-0130	Top Thrust Washer	1
15*	7090-0240	Feed Screw, 32P	1
15*	7090-0110	Feed Screw, 16P	1
15*	7090-0100	Feed Screw, 8P	1
15*	7090-0120	Feed Screw, 8P High Output	1
16	7090-0140	Bottom thrust Washer	1
17	3300-0353	U-Cup Seal	1
18*	7090-0070	Cartridge Body, 32P, 16P and 8P STD	1
18*	7090-0080	Cartridge Body, 8P High Output	1
19	TSD931-63	Luer Lock Adaptor, Stainless Steel	1
20	TSD931-82	Luer Lock Adaptor, Nylon®	1
21	TSD931-81	Luer Lock Elbow Adaptor, Nylon®	1

## 11. STANDARD ACCESSORIES

PART NUMBER	DESCRIPTION
5000-000-005	Valve Mounting Bracket
5000-015-000	TS-SS Sample Tip Kit
7090-9060	Syringe Bracket Kit, TS7000IMP Series
TSD1135-18	6 Pin DIN Socket
73003RHB	30 cc Receiver Head, 3 ft (0.9 m)
7000-CLEANKIT	Cleaning Kit

### 11.1 OPTIONAL ACCESSORIES

PART NUMBER	DESCRIPTION
TN00DKIT	Complete Dispensing Tip Kit
9000-000-112	Sample Tip Kit
7105XCON	Conditioning Cream, 10 cc
7305XCON	Conditioning Cream, 30 cc
7000-DMPBKIT	DMP Bracket Kit (must be used with A0100235 below)
A0100235	DMP body (must be used with 7000-DMPBKIT above)
71003RHB	10 cc Receiver Head, 3ft (0.9 m)



## 12. TROUBLE SHOOTING

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>CORRECTION</b>
No Fluid Flow	Dispense tip is clogged	Replace tip
	Motor does not receive signal	Make sure all connections are secured
	Motor running in reverse	Reverse motor cable connection
	Barrel of dispense fluid is empty	Replace with new fluid barrel
	Fluid feed pressure is too low	Increase feed pressure
Inconsistent Shot size	Fluid dried or cured	Replace with new fresh fluid
	Fluid pressure fluctuating	Make sure fluid pressure is constant
	Valve on-time is too short	Increase valve on time
	Excessive motor reverse time	Reduce reverse time or turn off completely
Inconsistent Shot size	Air trapped in fluid	Purge valve properly
Skipped dots	Feed screw damaged	Replace feed screw
	Air trapped in fluid	De-air fluid
Fluids drools after valve is turned off	Air trapped in feed screw chamber	Purge valve properly
	Air trapped in fluid reservoir	Remove air from reservoir

### 13. LIMITED WARRANTY

Manufacturer warrants this product to the original purchaser for a period of one (1) year from date of purchase to be free from defects in material and workmanship, but not against damages by misuse, negligence, accident, faulty installations, and instructions. Manufacturer will repair or replace (at 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 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, prior to return. Send warranty returns to:

#### **Americas and Asia**

OK International  
10800 Valley View Street  
Cypress, CA 90630  
USA

#### **Europe**

OK International  
Eagle Close  
Chandler's Ford Ind Est  
Eastleigh  
Hampshire  
SO53 4NF  
United Kingdom

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