

Model B40 Sealed External Cage Industrial and ASME B31.1 Construction

Installation and Operating Manual



Liquid

Level

Switches



MAGNETROL®

AMETEK®

LEVEL MEASUREMENT
SOLUTIONS

Read this Manual Before Installing

This manual provides information on the Model B40 Sealed External Cage Liquid Level Switch. It is important that all instructions are read carefully and followed in sequence. Detailed instructions are included in the Installation section of this manual.

Conventions Used in this Manual

Certain conventions are used in this manual to convey specific types of information. General technical material, support data, and safety information are presented in narrative form. The following styles are used for notes, cautions, and warnings.

Notes

Notes contain information that augments or clarifies an operating step. Notes do not normally contain actions. They follow the procedural steps to which they refer.

Cautions

Cautions alert the technician to special conditions that could injure personnel, damage equipment, or reduce a component's mechanical integrity. Cautions are also used to alert the technician to unsafe practices or the need for special protective equipment or specific materials. In this manual, a caution box indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Warnings

Warnings identify potentially dangerous situations or serious hazards. In this manual, a warning indicates an imminently hazardous situation which, if not avoided, could result in serious injury or death.

WARNING! Explosion hazard. Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Low Voltage Directive

For use in Category II installations. If equipment is used in a manner not specified by manufacturer, protection provided by equipment may be impaired.

Warranty

All Magnetrol mechanical level and flow controls are warranted free of defects in materials or workmanship for three full years from the date of original factory shipment.

If returned within the warranty period; and, upon factory inspection of the control, the cause of the claim is determined to be covered under the warranty; then, Magnetrol will repair or replace the control at no cost to the purchaser (or owner) other than transportation.

Magnetrol shall not be liable for misapplication, labor claims, direct or consequential damage or expense arising from the installation or use of equipment. There are no other warranties expressed or implied, except special written warranties covering some Magnetrol products.

Quality Assurance

The quality assurance system in place at Magnetrol guarantees the highest level of quality throughout the company. Magnetrol is committed to providing full customer satisfaction both in quality products and quality service.

The Magnetrol quality assurance system is registered to ISO 9001 affirming its commitment to known international quality standards providing the strongest assurance of product/service quality available.

Copyright © 2022 AMETEK Magnetrol USA, LLC. All rights reserved.

Performance specifications are effective with date of issue and are subject to change without notice. Magnetrol® reserves the right to make changes to the product described in this manual at any time without notice. Magnetrol makes no warranty with respect to the accuracy of the information in this manual.

Model B40 Sealed External Cage Liquid Level Switches

Table of Contents

1.0 Introduction		4.0 Reference Information	
1.1 Principle of Operation	4	4.1 Troubleshooting	9
1.2 Operating Cycle	4	4.1.1 Check switch mechanism	9
2.0 Installation		4.2 Agency Approvals	10
2.1 Unpacking	4	4.3 Replacement Parts	11
2.2 Piping	5	4.4 Specifications	12
2.3 Mounting	5	4.4.1 Dimensional Specifications	12
2.4 Wiring	6	4.5 Model Numbers	15
3.0 Preventive Maintenance		4.5.1 Part Number Industrial	
3.1 Recommended Practice	7	Grade Construction	15
3.1.1 Keep control clean	7	4.5.2 Part Number ASME	
3.1.2 Inspect switch mechanisms, terminals,		B31.1 Construction	17
and connections monthly	7		
3.1.3 Inspect entire unit periodically	8		
3.2 What to avoid	8		

1.0 Introduction

Magnetrol® B40 level switches are specifically designed for extremely high pressure, high temperature service conditions found principally in power plants, petroleum and petrochemical refineries, and nuclear power installations.

Caution: If equipment is used in a manner not specified by manufacturer, protection provided by equipment may be impaired.

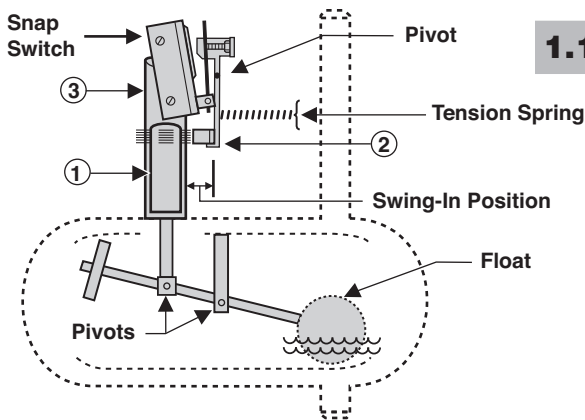


Figure 1
Switch Tripped

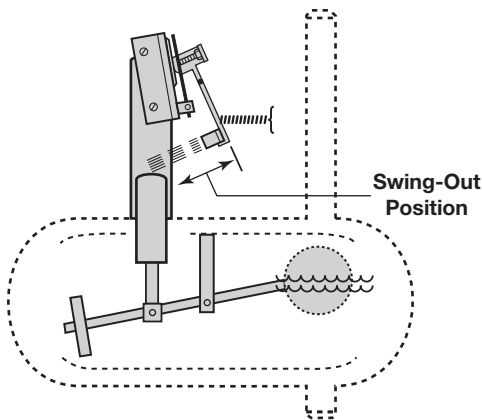


Figure 2
Switch Released

1.1 Principle of Operation

The design of Magnetrol float-operated level switches is based upon the principle that a magnetic field will “see through” non-magnetic materials such as 316 stainless steel. In this case, the float moves a magnetic attraction sleeve ① within a non-magnetic enclosing tube ③ and actuates a switch mechanism ②. The enclosing tube provides a pressure seal to the chamber and, therefore, to the process.

1.2 Operating Cycle

As the liquid level decreases in the chamber, refer to Figure 1, the float moves the magnetic attraction sleeve up, within the enclosing tube, and into the field of the switch mechanism magnet. As a result, the magnet is drawn in tightly to the enclosing tube causing the switch to trip, “making” or “breaking” an electrical circuit. As the liquid level rises, the float moves the attraction sleeve out of the magnetic field, releasing the switch at a predetermined low level (see Figure 2). The tension spring ensures the return of the switch in a snap action.

2.0 Installation

2.1 Unpacking

Unpack the instrument carefully, inspecting for damage. Report any concealed damage to the carrier within 24 hours. Check the contents listed on the packing slip and purchase order. Check and record the serial number for future reference when ordering parts.

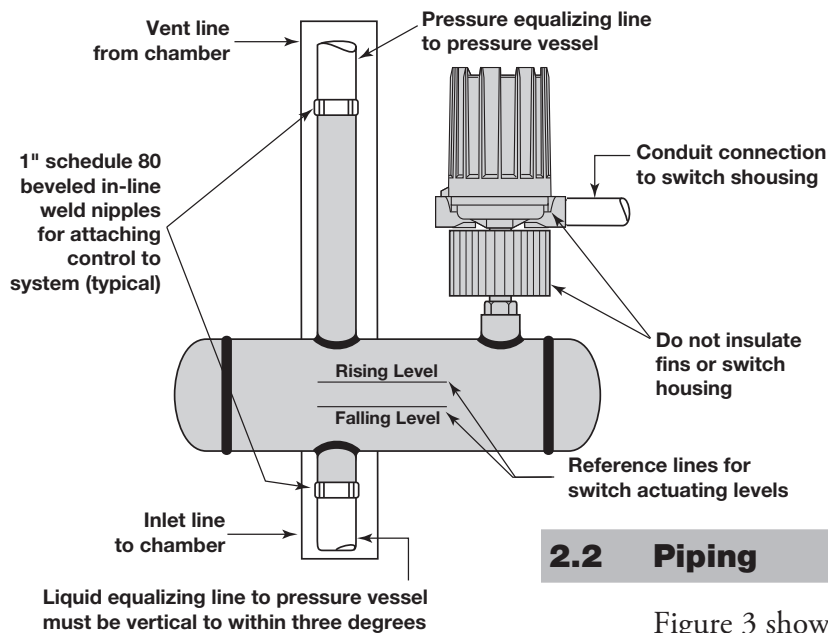


Figure 3

2.2 Piping

Figure 3 shows a typical piping installation of a Model B40 in a pipeline to a pressure vessel. Reference lines, on float chamber, should be aligned to correspond with liquid level in the vessel at which switch control is desired (refer to dimensional drawing, if furnished). Use pipe of sufficient strength to support the unit. If necessary, provide a stand or hanger to help support its weight. All piping should be straight and free of low spots or pockets so that the lower liquid line will drain towards the vessel and the upper vapor line will drain towards the control. Pipeline should be insulated, as shown, to minimize loss of liquid temperature and further control of the heat in the area of the switch housing. DO NOT insulate switch housing or fins.

NOTE: Manufacturer recommends that when welding chrome-moly steel piping, the procedures used conform to AWS-D10.8-61.

Caution: DO NOT INSULATE SWITCH MECHANISM HOUSING OR FINS.

NOTE: When reassembling the enclosing tube to the control, tighten to 200–225 ft-lbs.

2.3 Mounting

Caution: This instrument is intended for use in Installation Category II, Pollution Degree 2 locations.

Before welding, adjust piping to bring control to a vertical position. B40 level controls require that the enclosing tube be mounted within three degrees of vertical in all directions. A three degree slant is noticeable by eye, but installation should be checked using a spirit level.

Caution: Operation of all buoyancy type level devices should be done in such a way as to minimize the action of dynamic forces on the float or displacer sensing element. Good practice for reducing the likelihood of damage to the control is to equalize pressure across the device slowly.

2.4 Wiring

Caution: Level controls are shipped from the factory with the enclosing tube tightened and the middle set screw, on the housing base, locked to the enclosing tube. Failure to loosen the set screw prior to repositioning the conduit connection may cause the enclosing tube to loosen, resulting in the possible leakage of the process liquid or vapor.

Most B40 level control switch housings are designed to allow 360° positioning of the conduit outlet by loosening the set screw(s) located under the housing base. High temperature wire must be used between control and first junction box located in a cooler area.

NOTE: A switch or circuit breaker shall be installed in close proximity to equipment and within easy reach of operator. It shall be marked as the disconnecting device for equipment.

1. To gain access to switch mechanism, remove switch housing cover.
2. Pull in supply wires (conductors), wrap them around enclosing tube under the baffle plate and connect to proper terminals. Be certain that excess wire does not interfere with actuation of switch, and that adequate clearance exists for replacement of switch housing cover.

NOTE: For supply connections in installations with ambient temperature up to +75 °C, use wire with a minimum rating of +75 °C as required by process conditions. Installations with ambient temperatures up to +80 °C require wire with a minimum rating of +85 °C as required by process conditions. Use a minimum of 14 AWG wire for power and ground field wires.

NOTE: See Figure 4 or bulletin on switch mechanism furnished for proper terminal connections. Switch bulletin numbers are listed in the chart below.

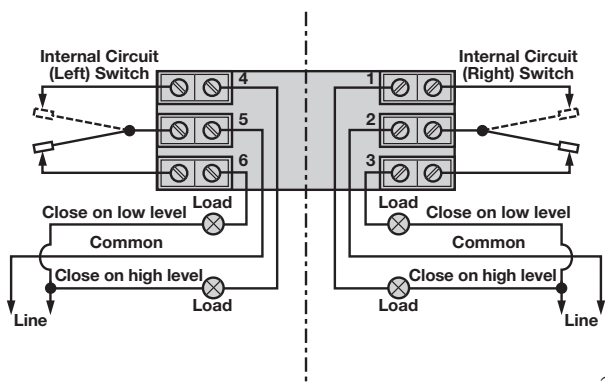


Figure 4

Switch Series Letter	Description	Bulletin No.
C, D, S	Dry Contact Switch	42-683
F	Hermetically Sealed Snap Switch	42-683
HS	Hermetically Sealed Snap Switch	42-694
R	High Temperature Snap Switch	42-799

3. Connect power supply to control and test switch action by varying liquid level in float chamber. If switch mechanism fails to function, check vertical alignment of control and consult installation instructions in switch mechanism bulletin.

-
4. Replace switch housing cover and place control into service.

If control has been furnished with NEMA 7/9 explosion proof (cast) or NEMA 4 moisture proof (gasketed) switch housing, check the following:

1. After wiring connections have been completed, housings must be sealed at the conduit outlet with a suitable compound to prevent entrance of air.
2. Check cover to base fit to be certain gasketed joint is tight. A positive seal is necessary to prevent infiltration of moisture laden air or corrosive gases into switch housings.

3.0 Preventive Maintenance

Periodic inspections are a necessary means to keep your Magnetrol level control in good working order. This control is a safety device to protect the valuable equipment it serves. A systematic program of preventive maintenance must be implemented when the control is placed into service. If the following is observed, your control will provide reliable protection of your capital equipment for many years.

3.1 Recommended Practice

3.1.1 Keep control clean

Be sure the switch housing cover is always in place on the control. This cover is designed to keep dust and dirt from interfering with switch mechanism operation. In addition, it protects against damaging moisture, and acts as a safety feature by keeping bare wires and terminals from being exposed. Should the housing cover or any seals become damaged or misplaced, obtain a replacement immediately.

3.1.2 Inspect switch mechanisms, terminals, and connections monthly

- a. Dry contact switches should be inspected for excessive wear on actuating lever or misalignment of adjustment screw at point of contact between screw and lever. Such wear can cause false switch actuating levels. Replace switch mechanism if wear or misalignment are apparent.

-
- b. DO NOT operate your control with defective or mal-adjusted switch mechanism (refer to bulletin on switch mechanisms furnished for service instructions).
 - c. Magnetrol controls may sometimes be exposed to excessive heat or moisture. Under such conditions, insulation on electrical wiring may become brittle, eventually breaking or peeling away. The resulting bare wires can cause short circuits. Check wiring carefully and replace at the first sign of brittle insulation.
 - d. Vibration may sometimes cause terminal screws to work loose. Check all terminal connections to make certain that screws are tightened.

NOTE: As a matter of good practice, spare switches should be kept on hand at all times.

3.1.3 Inspect entire unit periodically

Isolate control from vessel. Raise and lower liquid level to check for switch contact and reset.

3.2 What to avoid

1. Never leave switch housing cover off the control longer than necessary to make routine inspections.
2. Never place a jumper wire across terminals to “cut-out” the control. If a “jumper” is necessary for test purposes, be certain it is removed before placing control into service.
3. Never attempt to make adjustments or replace switches without reading instructions carefully. Certain adjustments provided for in level controls should not be attempted in the field. When in doubt, consult the factory or your local representative.
4. Never use lubricants on pivots of switch mechanisms. A sufficient amount of lubricant has been applied at the factory to ensure a lifetime of service. Further oiling is unnecessary and will only tend to attract dust and dirt which can interfere with mechanism operation.

4.0 Reference Information

4.1 Troubleshooting

Usually the first indication of improper operation is failure of the controlled equipment to function, i.e., pump will not start (or stop), signal lamps fail to light, etc. When these symptoms occur, whether at time of installation or during routine service thereafter, check the following potential external causes first.





- a. Fuses may be blown.
- b. Reset button(s) may need resetting.
- c. Power switch may be open.
- d. Controlled equipment may be faulty.
- e. Wiring leading to control may be defective.

If a thorough inspection of these possible conditions fails to locate the trouble, proceed next to a check of the control's switch mechanism.

4.1.1 Check switch mechanism

1. Pull disconnect switch or otherwise disconnect power to the control.
2. Remove switch housing cover.
3. Disconnect power wiring from switch assembly.
4. Swing magnet assembly in and out by hand to check carefully for any sign of binding. Assembly should require minimal force to move it through its full swing.
5. If binding exists, magnet may be rubbing enclosing tube. If magnet is rubbing, loosen magnet clamp screw and shift magnet position. Retighten magnet clamp screw.
6. If switch magnet assembly swings freely and mechanism still fails to actuate, check installation of control to be certain it is within the specified three degrees of vertical. (Use spirit level on side of enclosing tube in two places, 90° apart.) Refer to Figure 3 on page 5.
7. Check microswitch continuity with ohmmeter.
8. If switch mechanism is not operating satisfactorily, consult factory.

4.2 Agency Approvals

AGENCY	APPROVED MODEL	APPROVAL CLASSES
FM 	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9	Class I, Div 1, Groups C & D Class II, Div 1, Groups E, F & G
	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9 Class I, Div 1, Group B	Class I, Div 1, Groups B, C & D Class II, Div 1, Groups E, F & G
CSA 	All with a Series HS, F, 8 or 9 electric switch mechanism and a housing listed as CSA TYPE 4X	Class I, Div 2, Groups A, B, C & D
	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9	Class I, Div 1, Groups C & D Class II, Div 1, Groups E, F & G
	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9 Class I, Div 1, Group B	Class I, Div 1, Groups B, C & D Class II, Div 1, Groups E, F & G
ATEX / IEC Ex ^① 	All with an electric switch mechanism and an ATEX housing	ATEX II 2 G EEx d IIC T6 94/9/EC IEC Ex Ex d IIC T6 IP 66
CE 	Low Voltage Directives 2006/95/EC Per Harmonized Standard: EN 61010-1/1993 & Amendment No. 1	Installation Category II Pollution Degree 2

① IEC Installation Instructions:

The cable entry and closing devices shall be Ex d certified suitable for the conditions of use and correctly installed.

For ambient temperatures above +55 °C or for process temperatures above +150 °C, suitable heat resistant cables shall be used.

Heat extensions (between process connection and housing) shall never be insulated.

Special conditions for safe use:

When the equipment is installed in process temperatures higher than +85 °C the temperature classification must be reduced according to the following table as per IEC60079-0.

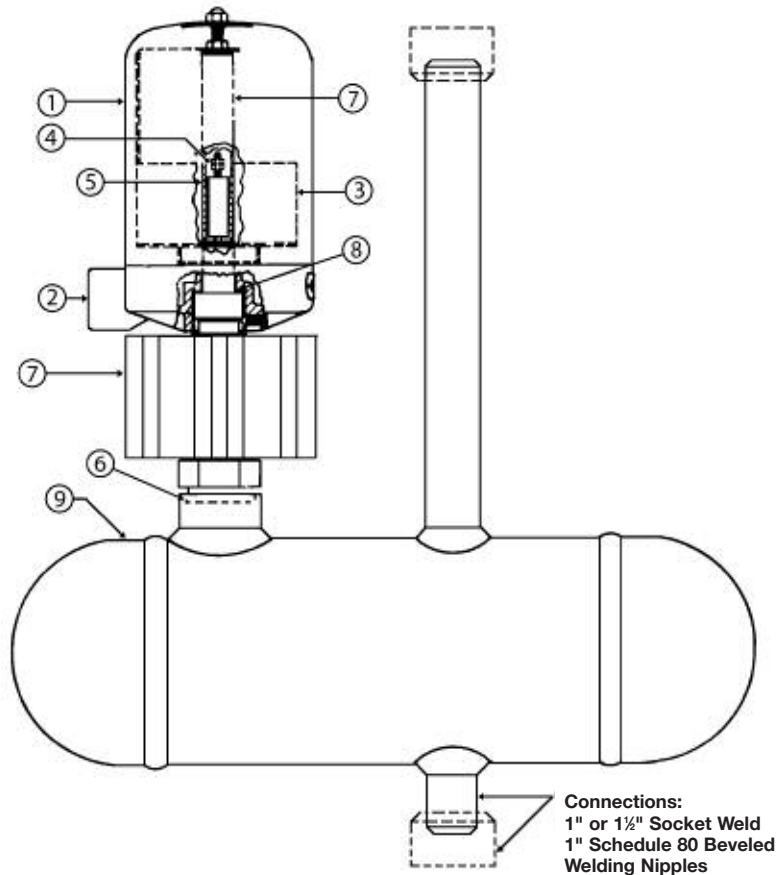
Maximum Process Temperature	Temperature Classification
< 85 °C	T6
< 100 °C	T5
< 135 °C	T4
< 200 °C	T3
< 300 °C	T2
< 450 °C	T1

These units are in conformity with IECEx KEM 05.0020X
Classification Ex d IIC T6
T_{ambient} -40 °C to +70 °C

4.3 Replacement Parts

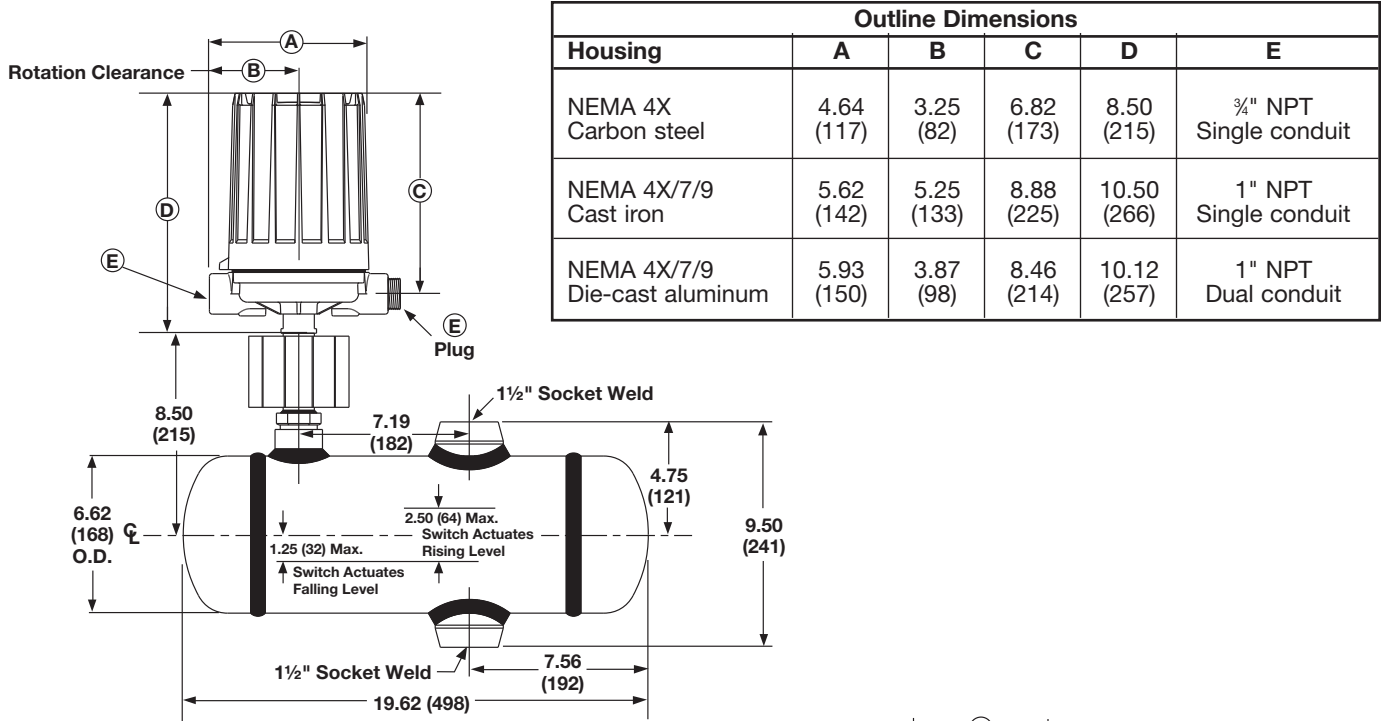
Item	Description	Model					
		B40-1C50	B40-1F30 B40-1B60 B40-PF30 B40-PB60 B40-3C30 B40-PC30	B40-PC20 B40-5C20	B40-HF30 B40-HB60	B40-4C40 B40-PC40	B40-HC40
1	Housing Cover	Refer to bulletin 42-683, 42-694 or 42-799					
2	Housing Base						
3	Switch mechanism						
4	Jam nut(s)	10-2106-004 (qty. 4)					
5	Attraction sleeve	32-4203-001			04-4511-002		
6	E-tube gasket	12-1204-001					
7	Enclosing tube	Z32-6312-001	Z32-6346-003	Z32-6357-002	Z32-6308-002	Z32-6357-003	
8	O-ring	12-2201-215	N/A	12-2201-215	N/A	N/A	
9	Float chamber assembly	Consult Factory					

IMPORTANT: When ordering, please specify:
 A. Model and serial number of control.
 B. Name and number of replacement assembly.

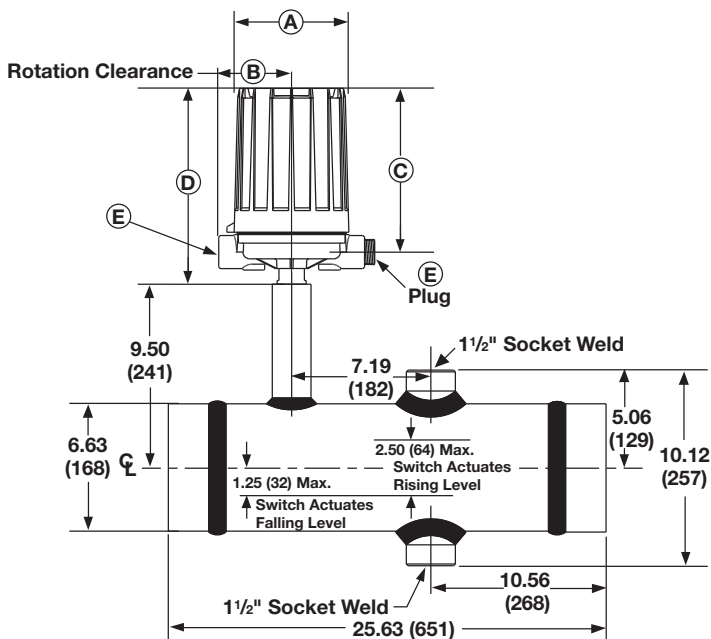


4.4 Specifications

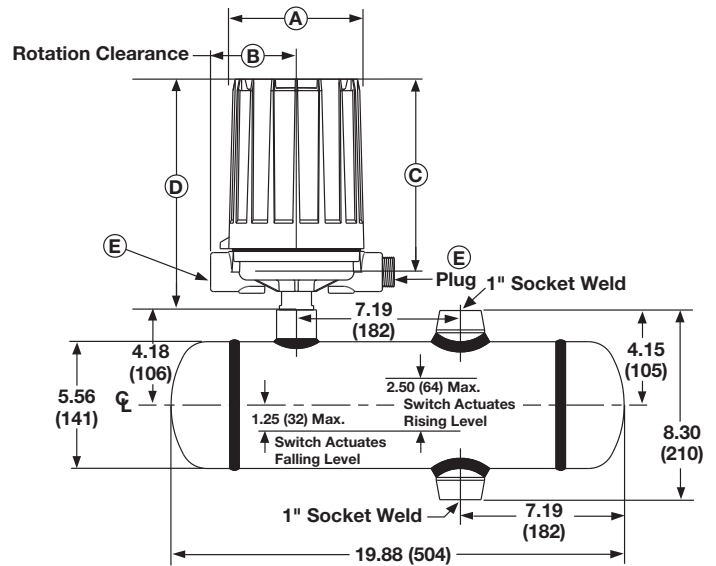
4.4.1 Dimensional Inches (mm)



B40-3C30 / B40-PC30



B40-PC40 and B40-HC40

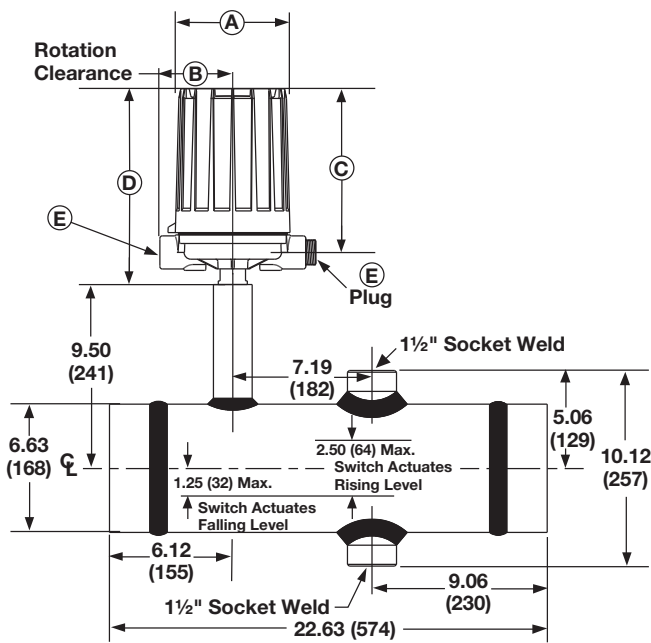


B40-5C20 / B40-PC20

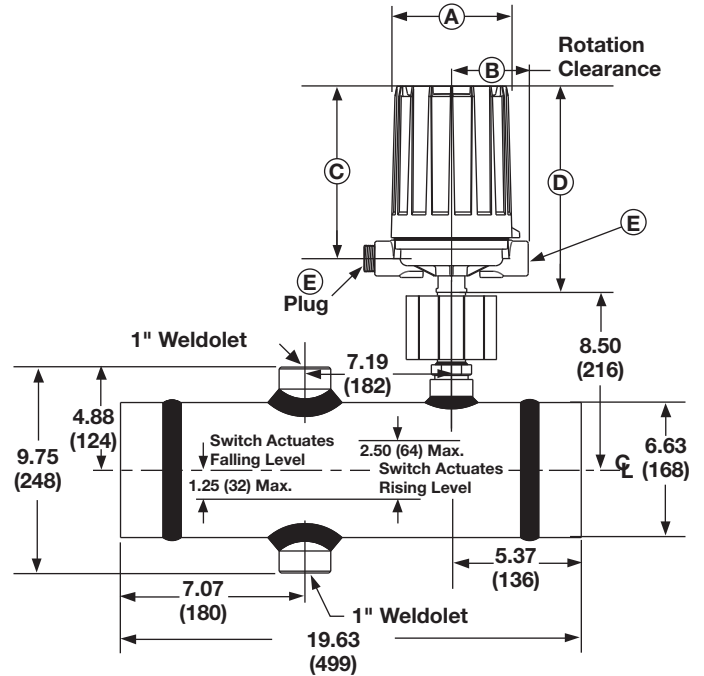
NOTES:

1. Allow 8 in (203 mm) overhead clearance for cover removal.
2. Maximum ambient temperature at switch head should not exceed +140 °F (+60 °C).

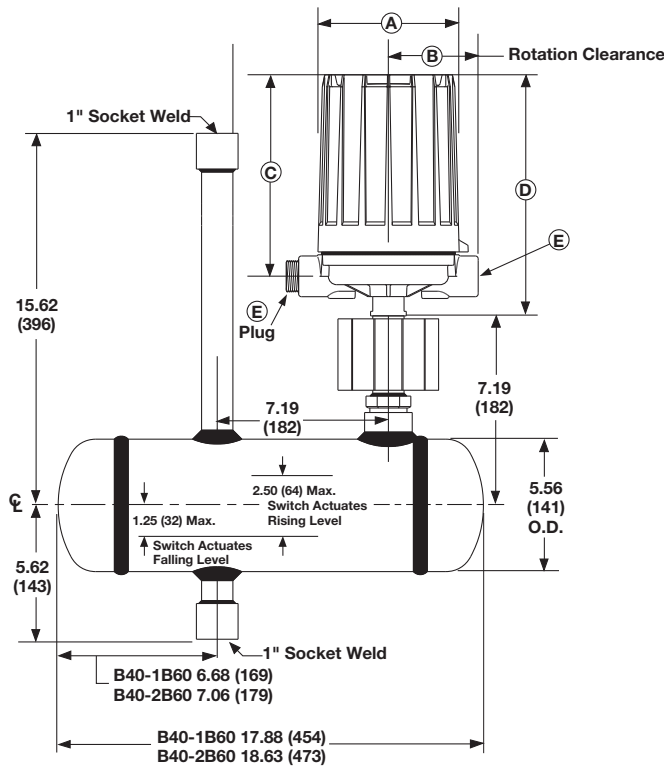
4.4.1 Dimensional Inches (mm) (continued)



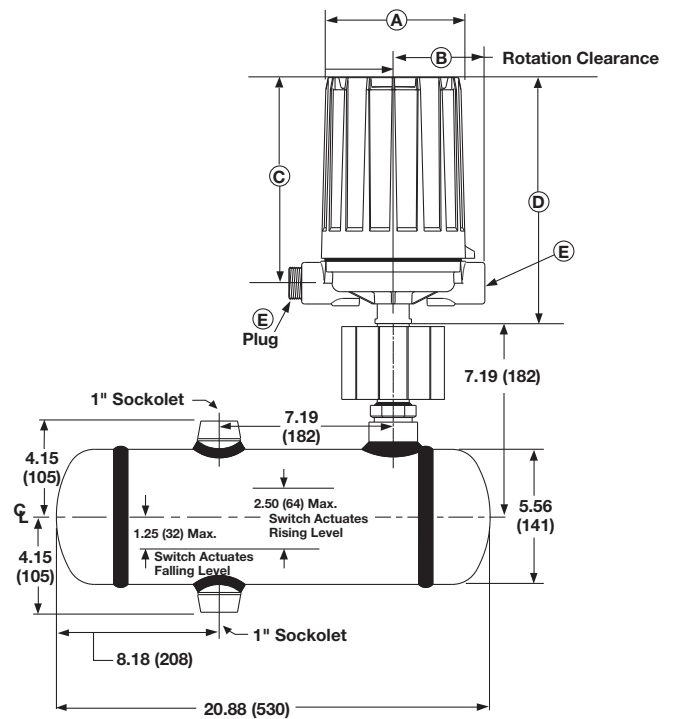
B40-4C40



B40-1C50



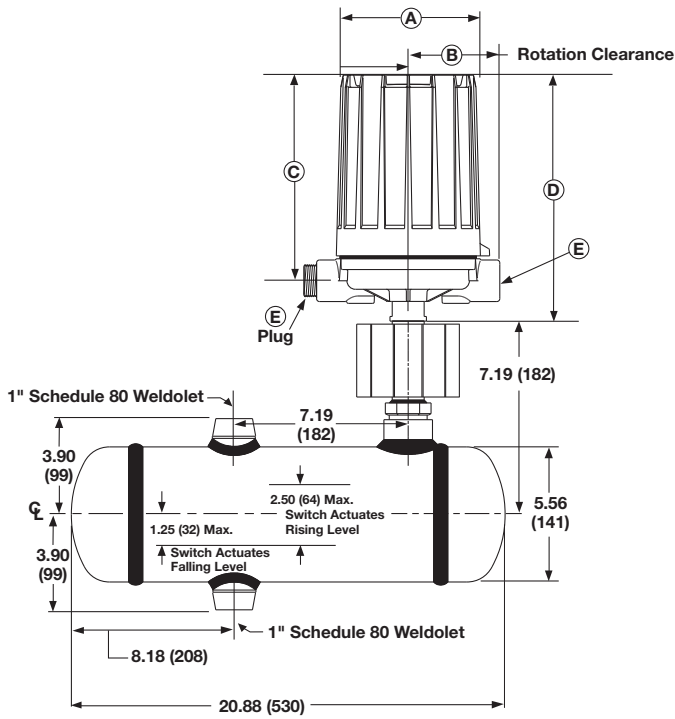
B40-1B60 and B40-2B60



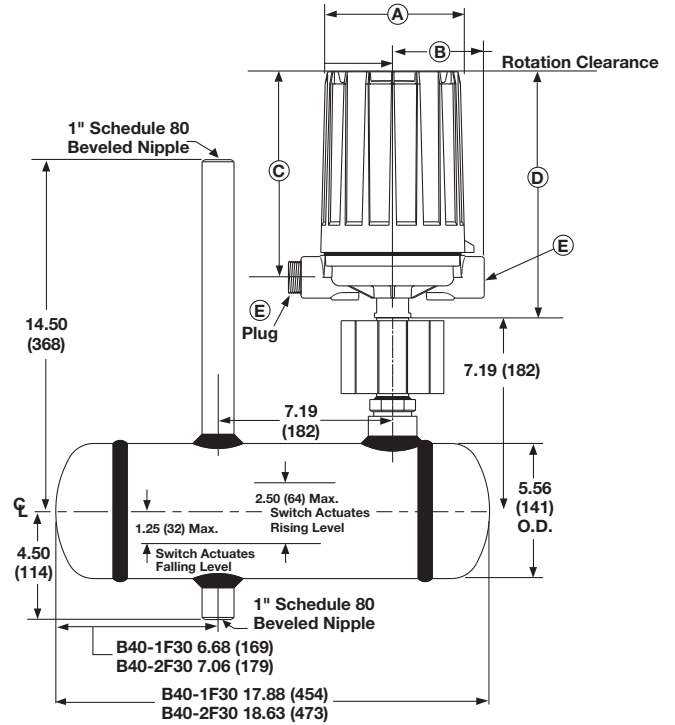
B40-PB60 and B40-HB60

Outline Dimensions					
Housing	A	B	C	D	E
NEMA 4X Carbon steel	4.64 (117)	3.25 (82)	6.82 (173)	8.50 (215)	3/4" NPT Single conduit
NEMA 4X/7/9 Cast iron	5.62 (142)	5.25 (133)	8.88 (225)	10.50 (266)	1" NPT Single conduit
NEMA 4X/7/9 Die-cast aluminum	5.93 (150)	3.87 (98)	8.46 (214)	10.12 (257)	1" NPT Dual conduit

4.4.1 Dimensional Inches (mm) (continued)



B40-HF30 and B40-PF30



B40-1F30 and B40-2F30

4.5 Model Numbers

4.5.1 Part Number Industrial Grade Construction

BASIC MODEL

B40	B40 Liquid Level Switch
-----	-------------------------

MATERIALS OF CONSTRUCTION/PRESSURE RATING PSI (BAR)

Code	Chamber Material	Float Material	Tank Connection	Min. S.G.	Temperature (°F)					
					100	500	750	800	1000	
1F30	P11/F11 Chrome-Moly	321/347 SS ②	1" welding nipple	0.65	2067 (142)	1777 (122)	1636 (112)	1615 (111)	651 (44)	
1B60			1" socket weld							
2F30	304 SS	316 SS	1" welding nipple		1857 (128)	1566 (107)	1294 (89)	1240 (85)	—	
2B60			1" socket weld							
3C30	Carbon Steel ①	321/347 SS ②	1½" socket weld		0.65	1925 (132)	1820 (125)	1250 (86)	1100 (75)	215 (14)
4C40	316 SS		1½" socket weld							
5C20	Carbon Steel ①		1" socket weld							
1C50	P11/F11 Chrome-Moly		1" weld coupling							

- ① Use caution when specifying carbon steel above +800 °F (+427 °C)
 ② Float material based on availability. Both 321 SS and 347 SS are stabilized austenitic stainless steels.



4.5.1 Part Number Industrial Grade Construction (continued)

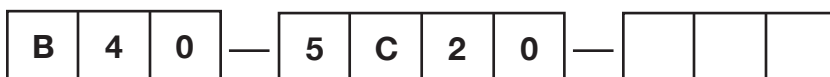
ELECTRIC SWITCH MECHANISM AND ENCLOSURE FOR ALL MODELS

Switch Description	Process Temperature Range ③	One Set Point	TYPE 4X/7/9 Aluminum Enclosure ④		
			Class I, Div. 1 Groups C & D	Class I, Div. 1 Group B	ATEX Ex II 2 G EEx d IIC T6
Series F Snap Switch Hermetically Sealed	-50 to +750 °F (-46 to +399 °C)	SPDT	FKB	FKK	FC9
		DPDT	FNB	FNK	FF9
Series R Snap Switch	-40 to +750 °F (-40 to +399 °C)	SPDT	RKB	RKK	RC9
		DPDT	RNB	RNK	RF9
Series S Snap Switch for AC Current Applications	-40 to +550 °F (-40 to +288 °C)	SPDT	SKB	SKK	SA9
		DPDT	SNB	SNK	SB9
Series S Snap Switch for DC Current Applications	-40 to +250 °F (-40 to +121 °C)	SPDT	SLB	SLK	SC9
		DPDT	SOB	SOK	SF9
Series 8 Hermetically Sealed Snap Switch	-50 to +750 °F (-46 to +399 °C)	SPDT	8KB	8KK	8C9
		DPDT	8NB	8NK	8F9
Series 9 Hermetically Sealed Snap Switch	-50 to +750 °F (-46 to +399 °C)	SPDT	9KB	9KK	9C9
		DPDT	9NB	9NK	9F9
			CS/Aluminum	Cast Iron	
			TYPE 4X	Class I, Div 1, Groups C & D	Class I, Div 1, Group B
Series R Snap Switch	-40 to +1000 °F (-40 to +538 °C) ⑤	SPDT	R1M	RKM	RKW
		DPDT	RDM	RNM	RNW
Series 9 Hermetically Sealed Snap Switch	-50 to +1000 °F (-46 to +538 °C) ⑤	SPDT	9AM	9KM	9KW
		DPDT	9DM	9NM	9NW



ELECTRIC SWITCH MECHANISM AND ENCLOSURE FOR MODEL B40-5C20 ONLY

Switch Description	Process Temperature Range ③	One Set Point	TYPE 4X/7/9 Aluminum Enclosure ④		
			Class I, Div. 1 Groups C & D	Class I, Div. 1 Group B	ATEX Ex II 2 G EEx d IIC T6
Series C Snap Switch	-40 to +450 °F (-40 to +232 °C)	SPDT	CKB	CKK	CC9
		DPDT	CNB	CNK	CF9
Series D Snap Switch for DC Current Applications	-40 to +250 °F (-40 to +121 °C)	SPDT	DKB	DKK	DC9
		DPDT	DNB	DNK	DF9
Series F Snap Switch Hermetically Sealed	-50 to +750 °F (-46 to +399 °C)	SPDT	FKB	FKK	FC9
		DPDT	FNB	FNK	FF9
Series HS 5 amp Snap Switch Hermetically Sealed w/Terminal Block	-50 to +550 °F (-46 to +288 °C) ⑥	SPDT	HM3	HM4	HA9
		DPDT	HM7	HM8	HB9
Series HS 5 amp Snap Switch Hermetically Sealed w/Wiring Leads	-50 to +550 °F (-46 to +288 °C) ⑥	SPDT	HMJ	HMK	—
		DPDT	HMS	HMT	—



③ Process temperature based on +100 °F (+38 °C) ambient.

④ Consult factory for TYPE 4X/7/9 cast iron housings.

⑤ Consult factory for temperatures above +842 °F (+450 °C).

⑥ On steam applications, temperature down-rated to +400 °F (+204 °C) process at +100 °F (+38 °C) ambient.

4.5.2 Part Number ASME B31.1 Construction

BASIC MODEL

B40-H	B40-H Liquid Level Switch for Temperatures Above +750 °F (+399 °C)
-------	--

MATERIALS OF CONSTRUCTION/PRESSURE RATING (PSIG)

	Chamber Material	Float Material	Tank Connection	Minimum S.G.	Temperature °F (°C)		
					750	800	1000
F30	P11/F11 Chrome-Moly	321/347 SS ^①	1" butt-weld	0.65	1584 (109)	1541 (106)	674 (46)
B60			1" socket weld				
C40	A312/A479 T316/316L SS		1 1/2" socket weld		3194 (220)	3155 (217)	3036 (209)

ELECTRIC SWITCH MECHANISM AND ENCLOSURE FOR MODEL B40-HXXX ONLY

Switch Description	Process Temperature Range ^②	One Set Point	CS/Aluminum	Cast Iron	
			TYPE 4X	Class I, Div 1, Groups C & D	Class I, Div 1, Group B
Series R Snap Switch	-40 to +1000 °F (-40 to +538 °C) ^③	SPDT	R1M	RKM	RKW
		DPDT	RDM	RNM	RNW
Series 9 Hermetically Sealed Snap Switch	-50 to +1000 °F (-46 to +538 °C) ^③	SPDT	9AM	9KM	9KW
		DPDT	9DM	9NM	9NW

- ① Float material based on availability. Both 321SS and 347SS are stabilized austenitic stainless steels.
- ② Process temperature based on +100 °F (+38 °C) ambient.
- ③ Consult factory for temperatures above +842 °F (+450 °C).



4.5.2 Part Number ASME B31.1 Construction (continued)

BASIC MODEL

B40-P	B40-P Liquid Level Switch for Temperatures Up To and Including +750 °F (+399 °F)
-------	--

MATERIALS OF CONSTRUCTION/PRESSURE RATING PSI (BAR)

	Chamber Material	Float Material	Tank Connection	Minimum S.G.	Temperature °F (°C)		
					100	500	750
F30	P11/F11 Chrome-Moly	321/347 SS ②	1" butt-weld	0.65	1830 (126)	1734 (119)	1584 (109)
B60			1" socket weld				
C30	A105/A106 ① Carbon Steel		1½" socket weld		1701 (117)	1701 (117)	1293 (89)
C40	A312/A479 T316/316L SS		1½" socket weld		3750 (258)	3571 (246)	3194 (220)
C20	A105/A106 ① Carbon Steel		1" socket weld		1667 (114)	1667 (114)	1267 (87)

- ① Use caution when specifying carbon steel above +800 °F (+427 °C).
- ② Float material based on availability. Both 321SS and 347SS are stabilized austenitic stainless steels.



4.5.2 Part Number ASME B31.1 Construction (continued)

ELECTRIC SWITCH MECHANISM AND ENCLOSURE FOR MODEL B40-PXXX ONLY

Switch Description	Process Temperature Range ^③	One Set Point	TYPE 4X/7/9 Aluminum Enclosure		
			Class I, Div. 1 Groups C & D	Class I, Div. 1 Group B	ATEX Ex II 2 G EEx d IIC T6
Series C Snap Switch	-40 to +450 °F (-40 to +232 °C)	SPDT	CKB	CKK	CC9
		DPDT	CNB	CNK	CF9
Series D Snap Switch for DC Current Applications	-40 to +250 °F (-40 to +121 °C)	SPDT	DKB	DKK	DC9
		DPDT	DNB	DNK	DF9
Series F Snap Switch Hermetically Sealed	-50 to +750 °F (-46 to +399 °C)	SPDT	FKB	FKK	FC9
		DPDT	FNB	FNK	FF9
Series HS 5 amp Snap Switch Hermetically Sealed w/Terminal Block	-50 to +400 °F (-46 to +204 °C) ^④	SPDT	HM3	HM4	HA9
		DPDT	HM7	HM8	HB9
Series HS 5 amp Snap Switch Hermetically Sealed w/Wiring Leads	-50 to +400 °F (-46 to +204 °C) ^④	SPDT	HMJ	HMK	—
		DPDT	HMS	HMT	—
Series R Snap Switch	-40 to +750 °F (-40 to +399 °C)	SPDT	RKB	RKK	RC9
		DPDT	RNB	RNK	RF9
Series S Snap Switch for AC Current Applications	-40 to +550 °F (-40 to +288 °C)	SPDT	SKB	SKK	SA9
		DPDT	SNB	SNK	SB9
Series S Snap Switch for DC Current Applications	-40 to +250 °F (-40 to +121 °C)	SPDT	SLB	SLK	SC9
		DPDT	SOB	SOK	SF9
Series 8 Hermetically Sealed Snap Switch	-50 to +750 °F (-46 to +399 °C)	SPDT	8KB	8KK	8C9
		DPDT	8NB	8NK	8F9
Series 9 Hermetically Sealed Snap Switch	-50 to +750 °F (-46 to +399 °C)	SPDT	9KB	9KK	9C9
		DPDT	9NB	9NK	9F9

- ③ Process temperature based on +100 °F (+38 °C) ambient.
- ④ On steam applications, temperature down rated to +400 °F (+204 °C) process at +100 °F (+38 °C) ambient.



Service Policy

Owners of Magnetrol controls may request the return of a control or any part of a control for complete rebuilding or replacement. They will be rebuilt or replaced promptly. Controls returned under our service policy must be returned by Prepaid transportation. Magnetrol will repair or replace the control at no cost to the purchaser (or owner) other than transportation if:

1. Returned within the warranty period; and
2. The factory inspection finds the cause of the claim to be covered under the warranty.

If the trouble is the result of conditions beyond our control; or, is NOT covered by the warranty, there will be charges for labor and the parts required to rebuild or replace the equipment.

In some cases it may be expedient to ship replacement parts; or, in extreme cases a complete new control, to replace the original equipment before it is returned. If this is desired, notify the factory of both the model and serial numbers of the control to be replaced. In such cases, credit for the materials returned will be determined on the basis of the applicability of our warranty.

No claims for misapplication, labor, direct or consequential damage will be allowed.

Return Material Procedure

So that we may efficiently process any materials that are returned, it is essential that a "Return Material Authorization" (RMA) number be obtained from the factory, prior to the material's return. This is available through a Magnetrol local representative or by contacting the factory. Please supply the following information:

1. Company Name
2. Description of Material
3. Serial Number
4. Reason for Return
5. Application

Any unit that was used in a process must be properly cleaned in accordance with OSHA standards, before it is returned to the factory.

A Material Safety Data Sheet (MSDS) must accompany material that was used in any media.

All shipments returned to the factory must be by prepaid transportation.

All replacements will be shipped F.O.B. factory.

