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# ***GREAT PLAINS INDUSTRIES, INC.***

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## **Positive Displacement Flowmeters**

### **— GMO15 series instruction manual —**



**GMO15 Pulse Meter From serial No. CXXXX**

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# To the owner

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Thank you for purchasing a GPI GM Series Flow Meter. Please take a few minutes to read through this manual before installing and operating your meter. If you have any problems with the meter, refer to the maintenance and trouble shooting sections of this manual.

This manual contains connection and operating instructions for the GM015 Series meters with pulse outputs. For models with display, an additional instruction manual is supplied. If you need further assistance, contact your

local GPI representative or contact GPI by telephone or fax for advice.

The GPI GM Series Flow Meter has incorporated the oval rotor principal into its design. This has proven to be a reliable and highly accurate method of measuring flow. Exceptional repeatability and high accuracy over a wide range of fluid viscosities and flow rates are features of the GM Series flow meter design. The low pressure drop and high pressure rating means the GM Series flow meter is suitable for both gravity and pump (in line) applications.

The GPI GM Series flow meters are available in either aluminium, Bronze or 316 stainless steel. Standard rotors are made from PPS (Polyphenylene Sulfide Resins) with optional 316 stainless steel rotors available for both stainless steel and aluminium models.

The GM015 Series is available with either;

\* Standard Pulse

\* Standard LC Display and Pulse

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## Important Information

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### **PLEASE READ THIS INFORMATION CAREFULLY BEFORE USE!**

Before use, confirm the fluid to be used is compatible with the meter (refer to the GPI fluid compatibility chart), or consult your local GPI representative for advice.

To prevent damage from dirt or foreign matter, GPI recommends a Y or Basket type 60 mesh strainer be installed as close as possible to the inlet side of the meter (if required contact Macnaught for further information).

Note: When a strainer is installed it should be regularly inspected and

cleaned. Failure to keep the strainer clean will dramatically effect flow meter performance.

To prevent damage to the meter slowly fill the system with fluid (this will prevent damage caused by air purge).

Note: Failure to do this could damage the meter.

For pump applications, turn off the pump at the end of each day.

Maintenance can be carried out to the liquid crystal displays and pulse units without removing or isolating the meter from the line. When maintenance to any other part of the meter is required,

the meter must be isolated and the line pressure reduced.

The reed switch pulse unit can cause inaccurate rate counts when used with high speed counters. It is advised that a debounce circuit be used or alternatively use the hall effect sensor option.

# Installation

1] GPI recommends that when setting up pipework for meter installations a bypass line be included in the design. This provides the facility for a meter to be removed for maintenance without interrupting production. (See Fig.1)

(Refer to Fig.2 for correct installation) The register assembly may be orientated to suit the individual installation.

**Note: Incorrect installation can cause premature wear of meter components.**

2] Use thread sealant on all pipe threads. For flanged versions use appropriate companion flanges and gaskets are required.

3] For pump applications ensure pipe work has the appropriate working pressure rating to match the pressure output of the pump.

4] Install a wire mesh strainer (Y or basket type 60 mesh as close as possible to the inlet side of the meter.

5] Ensure that the meter is installed so that the flow of the liquid is in the direction of the arrows embossed on the meter body.

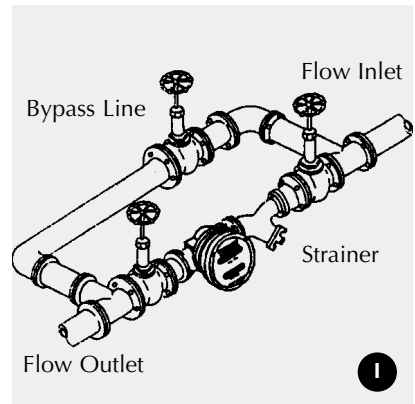
6] The meter can be installed in any orientation as long as the meter shafts are in a horizontal plane.

7] Do not over tighten meter connections.

8] **It is important that after initial installation you fill the line slowly, high speed air purge could cause damage to the rotors.**

9] Test the system for leaks.

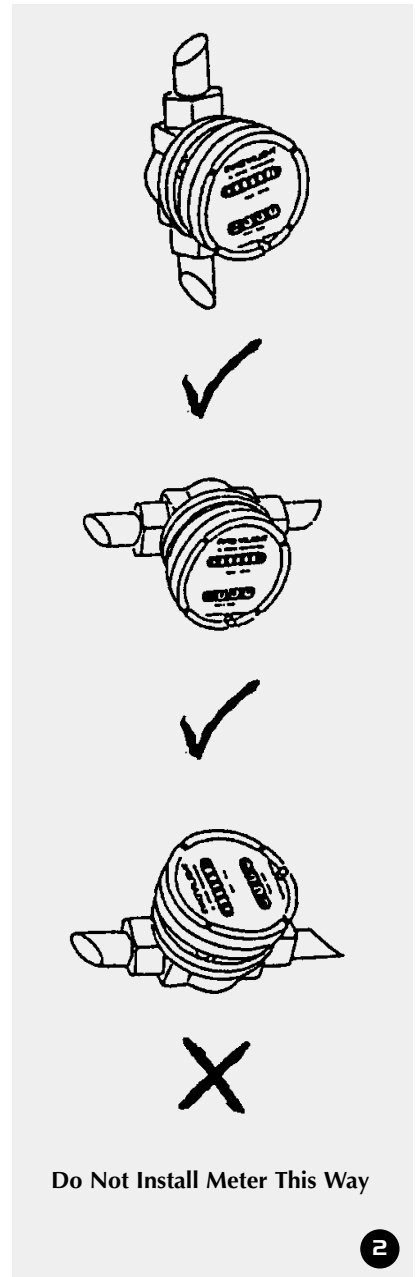
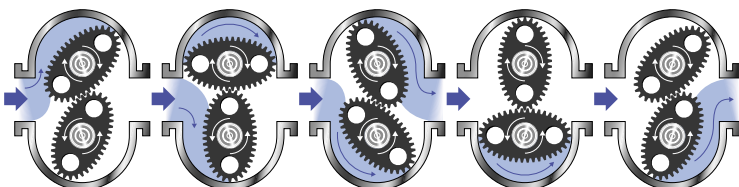
10] Check the strainer for swarf or foreign material, after the first 200 litres check periodically, particularly if the flow rate decreases.



# Operation

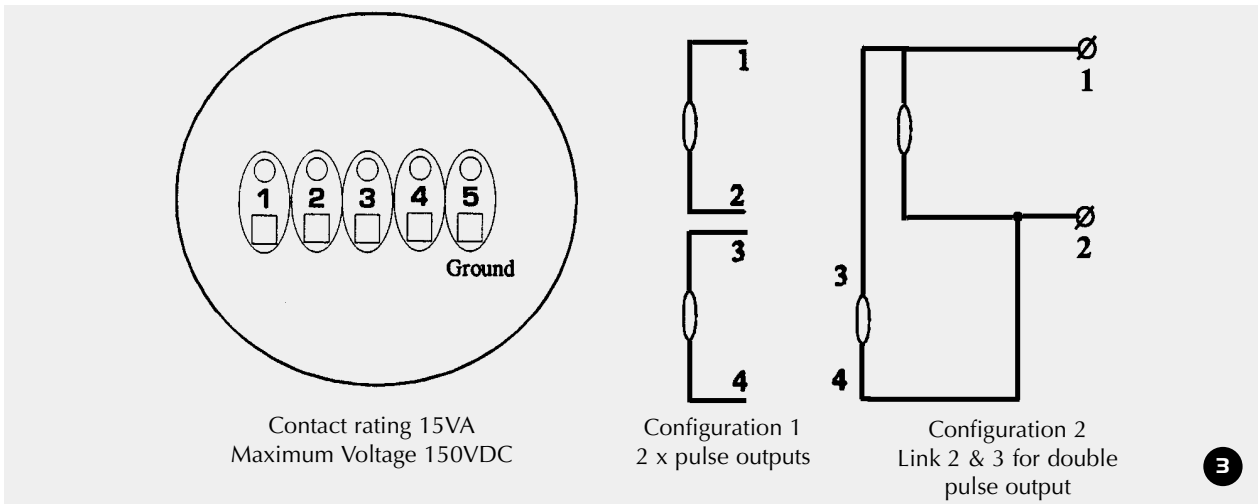
When fluid passes through the meter, rotors turn. The magnets which are located in the rotors will pass across the pulser circuit board (containing either Reed switches or Hall Effect

sensors). A signal is received which is then sent by the Pulse Circuit Board (PCB) to the relevant LC display or receiving instrument.

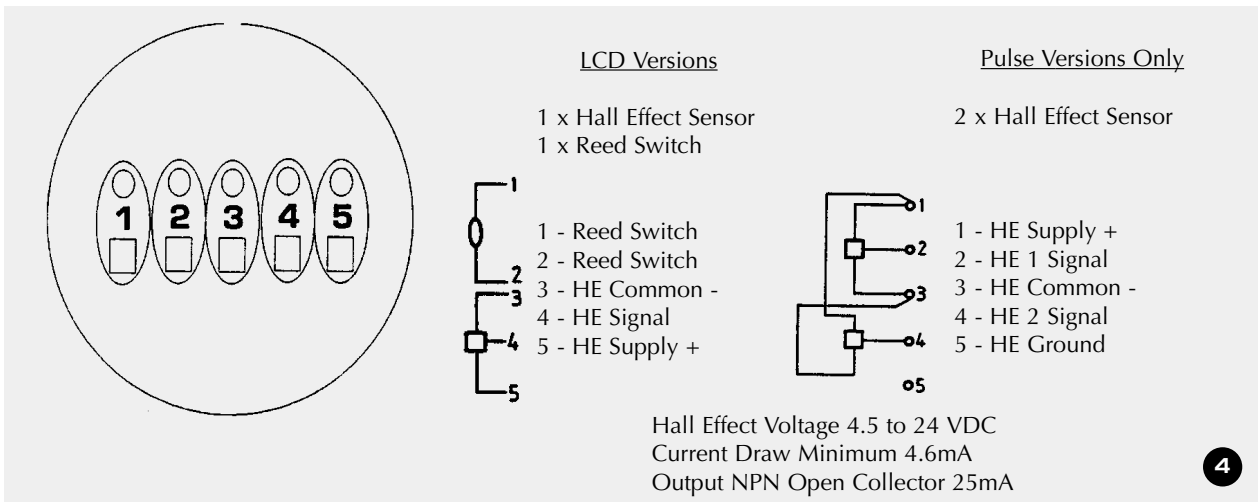


# Electrical Connections

## Reed Switch Connections for PCB Terminals - refer Fig.3



## Hall Effect Sensor Connections - refer Fig.4



# Service Instructions

### Disassembly

Ensure that the fluid supply to the meter is disconnected, and the line pressure is released before disassembly, with the exception for repair or maintenance to the LC Display or PCB where there is no

necessity to isolate the meter from flow. Refer to the exploded parts diagram on page 5.

**1a]** Units with Pulse Caps; Undo the conduit connector, remove pulse cap (item 9) and remove the wires

from the pulse terminal board (item 5).

**1b]** Standard LC Display; Mark the display orientation with a marking pen, unscrew the four large screws on top of the LC Display. Carefully separate the LC Display from the

plastic housing and disconnect the wires from the pulse terminal block.

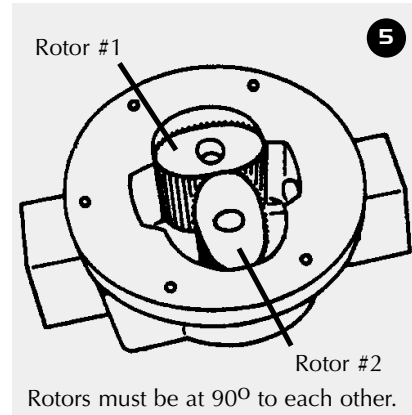
- 2] Remove the mounting adaptor plate and gasket.
- 3] Loosen the eight cap head screws (Item 7) that hold down the meter cap (Item 4), remove the screws, washers and lift off the cap.
- 4] Remove the o’ring (Item 2) from the o’ring groove in the meter cap (Item 4).
- 5] Remove rotors (Item 3).

**Reassembly**

- 1] Before reassembling check the condition of the rotors (replace if necessary).
- 2] Check that the smooth side of the rotors (not the plug side) is facing you when inserting the rotors, the smooth side of the rotor is the magnet side. There is no difference between rotor one or rotor two.
- 3] Replace the rotors (Item 3) onto the shafts at 90° to each other (refer Fig. 5) and check their operation by

turning either of the rotors. If the rotors are not in mesh correctly or do not move freely, remove one of the rotors and replace correctly at 90° to the other rotor. Re-check the operation of the rotors.

- 4] Replace the o’ring (Item 2) into groove in the meter cap, if the o’ring has grown or is damaged in any way replace it with a new part.
- 5] Replace the meter cap making sure that the locating pin in the body lines up with the hole in the meter cap. Insert the cap head screws (Item 7) and tighten in the sequence 1, 6, 2, 5, 3, 7, 4, 8.
- 6] The replacement of cables and connectors are a reversal of the disassembly procedure, replace conduit fitting if required. When replacing the Standard LC Display, confirm the orientation marks made on disassembly are aligned then screw the register into place.
- 7] Test the meter by turning the rotors with a finger or by applying very low air pressure (no more than a good breath) to one end of the meter,



before returning the meter to the line.

**Pulse Circuit Board (PCB) Notes:**

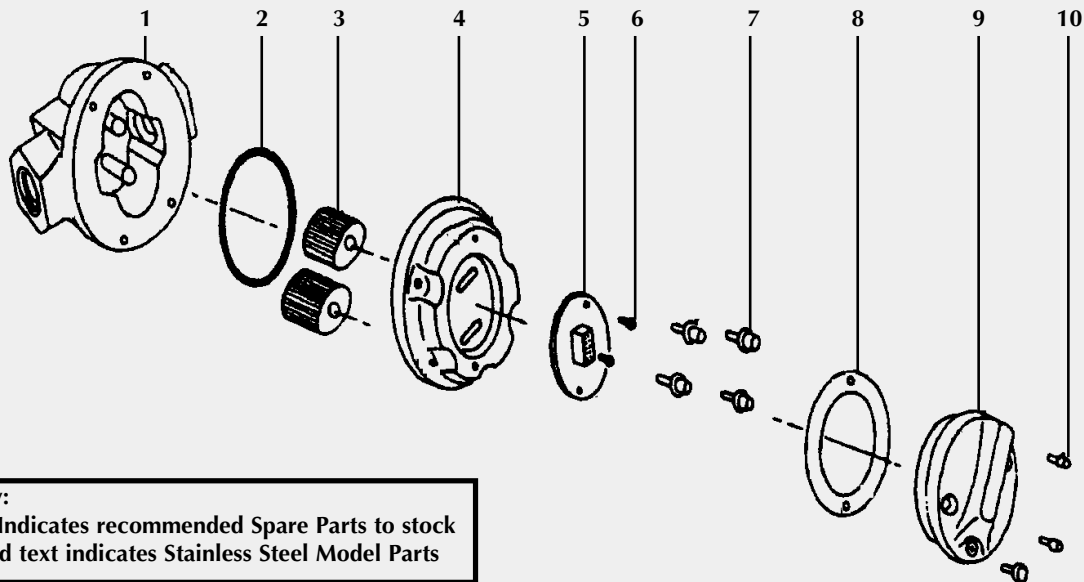
The pulse PCB (Item 5) is fitted with (A) two reed switches; (B) hall effect sensors; or (C) one reed switch and one hall effect sensor. The PCB board is fastened to the meter cap (Item 4) by two screws and stand off’s. All care and caution should be taken when removing or handling the PCB as both the reed switch and hall effect sensor are fragile.

Individual reed switches or hall effect sensors are not available as individual replacement parts and are only available with the PCB (Item 5).

# Meter Trouble Shooting

TROUBLE	CAUSE	REMEDY
Fluid will not flow through meter	<ol style="list-style-type: none"> <li>a] Foreign matter blocking rotors</li> <li>b] Line strainer blocked</li> <li>c] Damaged rotors</li> <li>d] Meter connections over tightened</li> <li>e] Fluid is too viscous</li> </ol>	<ol style="list-style-type: none"> <li>a] Dismantle meter, clean rotors (Strainer must be fitted in line)</li> <li>b] Clean strainer</li> <li>c] Replace rotors</li> <li>d] Re-adjust connections</li> <li>e] See specifications for rated viscosity</li> </ol>
Reduced flow through the meter	<ol style="list-style-type: none"> <li>a] Strainer is partially blocked</li> <li>b] Fluid is too viscous</li> </ol>	<ol style="list-style-type: none"> <li>a] Clean strainer</li> <li>b] See specifications for rated viscosity</li> </ol>
Meter reading inaccurate	<ol style="list-style-type: none"> <li>a] Fluid flow rate is too high or too low</li> <li>b] Fluid is too viscous</li> <li>c] Excess wear caused by incorrect installation</li> </ol>	<ol style="list-style-type: none"> <li>a] See “specifications” for rated flow</li> <li>b] Bleed air from system</li> <li>c] Check meter body and rotors. Replace as required.</li> </ol>
Meter not giving a pulse signal	<ol style="list-style-type: none"> <li>a] Faulty hall effect sensor</li> <li>b] Faulty reed switch</li> <li>c] Magnets failed</li> </ol>	<ol style="list-style-type: none"> <li>a] Replace PCB Board</li> <li>b] Replace PCB Board</li> <li>c] Replace magnets</li> </ol>

# Meter Parts Listing



**Key:**  
u Indicates recommended Spare Parts to stock  
**Bold text** indicates Stainless Steel Model Parts

Item No.	No. Off.	Rec. Parts	Part or Set (Order from this column only)	Part Description
1	1		MS191B	Meter Body 1 1/2" BSP (Aluminium)
1	1		MS191N	Meter Body 1 1/2" NPT (Aluminium)
<b>1</b>	<b>1</b>		<b>MS189B</b>	<b>Meter Body 1 1/2" BSP (Stainless Steel)</b>
<b>1</b>	<b>1</b>		<b>MS189N</b>	<b>Meter Body 1 1/2" NPT (Stainless Steel)</b>
1	1		MS191F	Meter Body 1 1/2" ANSI 150lb Flange (Aluminium)
1	1		MS191D	Meter Body 1 1/2" DIN16 Flange (Aluminium)
<b>1</b>	<b>1</b>		<b>MS189F</b>	<b>Meter Body 1 1/2" ANSI 150lb Flange (S/Steel)</b>
<b>1</b>	<b>1</b>		<b>MS189D</b>	<b>Meter Body 1 1/2" DIN16 Flange (S/Steel)</b>
2	1	u	BS243TE	"O" Ring (Teflon)
2	1	u	BS243V	"O" Ring (Viton)
3	2	u	MS58S	Rotors PPS (Polyphenylene Sulfide Resins)
<b>3</b>	<b>2</b>	<b>u</b>	<b>MS58-1S</b>	<b>Rotors (Stainless Steel)</b>
3	2	u	MS58HS	High Viscosity Rotors (PPS)
<b>3</b>	<b>2</b>	<b>u</b>	<b>MS58-1HS</b>	<b>High Viscosity Rotors (Stainless Steel)</b>
4	1		MS220	Meter Cap (Aluminium)
<b>4</b>	<b>1</b>		<b>MS221</b>	<b>Meter Cap (Stainless Steel)</b>
5	1	u	MS201-R	PCB (Standard Reed Switch)
5	1	u	MS201-HE	PCB (Hall Effect Sensor)
5	1		MS201-R/HE	PCB ( 1 Reed Switch & 1 Hall Effect Sensor)
6	4		MS284S	PCB Board Screws
7	6	u	MS116S	Meter Cap Screws (Standard)
<b>7</b>	<b>6</b>	<b>u</b>	<b>MS180S</b>	<b>Meter Cap Screws (Stainless Steel)</b>
8	1	u	MS300	Pulser Cap Gasket
9	1		MS160	Pulser Cap (Aluminium) 20mm Conduit Thread
9	1		MS160N	Pulser Cap (Aluminum) 1/2" NPT Thread
<b>9</b>	<b>1</b>		<b>MS170</b>	<b>Pulser Cap (Stainless Steel) 20mm Conduit Thread</b>
<b>9</b>	<b>1</b>		<b>MS170N</b>	<b>Pulser Cap (Stainless Steel) 1/2" NPT Thread</b>
10	4		MS115S	Pulser Cap Screw (Stainless Steel)
11	1		MS37	Warning Label (Not Shown)
13	1		Customer to Specify	Legend Plate (Not Shown) inc. Hammer Screws

# Meter Specifications

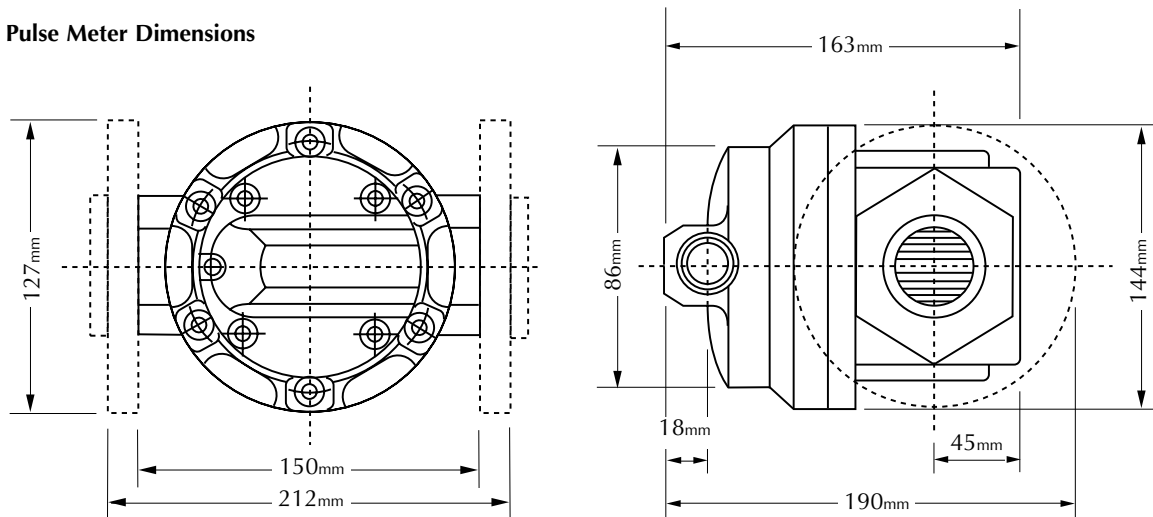
Meter Type	Pulse
<b>Flow Ranges</b> (Litres per minute/US Gallons per minute)	
<b>Above 5 Centipoise</b>	10 to 250/ 2.6 to 66
<b>Below 5 Centipoise</b>	15 to 235/ 4 to 62
<b>Accuracy of Reading</b>	+/- 0.5%
<b>Maximum Viscosity*</b>	1000 Centipoise
<b>Maximum Operating Pressure**</b>	1800 kPa/ 260 PSI/ 18 BAR
<b>Operating Temp. Range</b>	<b>Alum.</b> -10°C/ 14°F to 80°C/ 176°F <b>S.S.</b> -10°C/ 14°F1 to 120°C/ 248°F
<b>Pulse Type</b>	Dual Reed Switches or Hall Effect Sensor or combination HE Sensor/Reed Switch
<b>Pulses Per Litre/US Gallon</b>	14.5/ 29 or 54.9/ 109.7

\* Unless High Viscosity Rotors are fitted

\*\* Meter conforms to PED 97/23/EC CAT 1.

# Meter Dimensions

Pulse Meter Dimensions



# Warranty

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## Great Plains Industries, Inc. Limited Warranty Policy

Great Plains Industries, Inc., 5252 East 36th Street North, Wichita, Kansas USA 67220-3202, hereby provides a limited one year warranty against defects in material and workmanship on all products manufactured by Great Plains Industries, Inc. This warranty shall extend to the purchaser of this product and to any person to whom such product is transferred during the warranty period.

The warranty period shall begin on the date of the original new equipment purchase. Warrantor's obligation hereunder shall be limited to repairing defective workmanship or replacing or repairing any defective part or parts. This warranty shall not apply if:

- a.) the product has been altered or modified outside the warrantor's duly appointed representative;
- b.) the product has been subjected to neglect, misuse, abuse or damage or has been installed or operated other than in accordance with the manufacturer's operating instructions.

To make a claim against this warranty, notice of claim must be given in writing to the company at its above address no later than 30 days after the expiration of the warranty period. Such notice shall identify the defect in the product. The company shall, within 14 days of receipt of such notice, notify the customer to either send the product, transportation prepaid, to the company at its office in Wichita, Kansas, or to duly authorized service center. The company shall perform all obligations imposed on it by the terms of this warranty within 60 days of receipt of the defective product.

GREAT PLAINS INDUSTRIES, INC. EXCLUDES LIABILITY UNDER THIS WARRANTY FOR DIRECT, INDIRECT, INCIDENTAL AND CONSEQUENTIAL DAMAGES INCURRED IN THE USE OR LOSS OF USE IF THE PRODUCT WARRANTED HEREUNDER.

The company herewith expressly disclaims any warranty of merchantability or fitness for any particular purpose other than for which it was designed.

This warranty gives you specific rights and you may also have other rights which vary from U.S. state to U.S. state.

NOTE: In compliance with MAGNUSON MOSS CONSUMER WARRANTY ACT - Part 702 (governs the resale availability of the warranty terms).



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