



OPD-00001

Overload Protection Device

User's Guide

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Contents

1	Introduction.....	4
2	Definitions & Acronyms	4
3	OPD Overview.....	Error! Bookmark not defined.
4	Mechanical Description.....	5
5	Quick Start Guide	6
5.1	Configuration	6
5.1.1	Connecting to the System	7
5.1.2	Calibration	9
6	OPD Hardware Description.....	10
6.1	Relay Outputs.....	10
6.1.1	MGNet Interface.....	10
7	OPD Operational Description	11
8	OPD Configuration	11
8.1	Main Dashboard.....	12
8.1.1	Sensor Setup	13
8.1.2	Calibration	13
8.1.3	Relay Outputs	18
8.2	Alarm Setup	18
9	Specifications.....	19
	Reference A – Option Matrix.....	20
	Reference E – Warranty Requirements.....	21

WARNING!

This equipment must be operated by trained personnel. ALL safety related functions are the responsibility of the user. This equipment is NOT intended to replace personal responsibility for any safety related function.

1 Introduction

The Overload Protection Device (OPD) is an intelligent device in the McCoy Global Product Portfolio. The OPD provides a cost effective solution for standard bridge crane systems or other load monitoring applications. The OPD can support a single load pin. In addition, the OPD supports alarm outputs such as high and low alarms. This manual will include information including startup, system operation, calibration and system configuration.

2 Definitions & Acronyms

- MGNNet – Is a proprietary protocol on a CAN bus message that allow for simple communications between devices on a network.
- OPD – Overload Protection Device

3 OPD Overview

The OPD is a single device bridge crane controller that can provide a high level of functionality in a small package.



Figure 1 OPD

Hardware Features

- ABS enclosure design
- 12 or 24 volt DC Operation
- 4 Relay Outputs with a contact rating of 30VDC, 240VAC @ 10amps

Product Features:

- Supports load pin and communicates over a digital network
- Up to 4 configurable relay outputs
- Up to 8 point calibration per hoist
- Unit less system allowing the user to define the output
- Automatic pin detection and communication monitoring

4 Mechanical Description

The OPD is a single board platform in a small package.

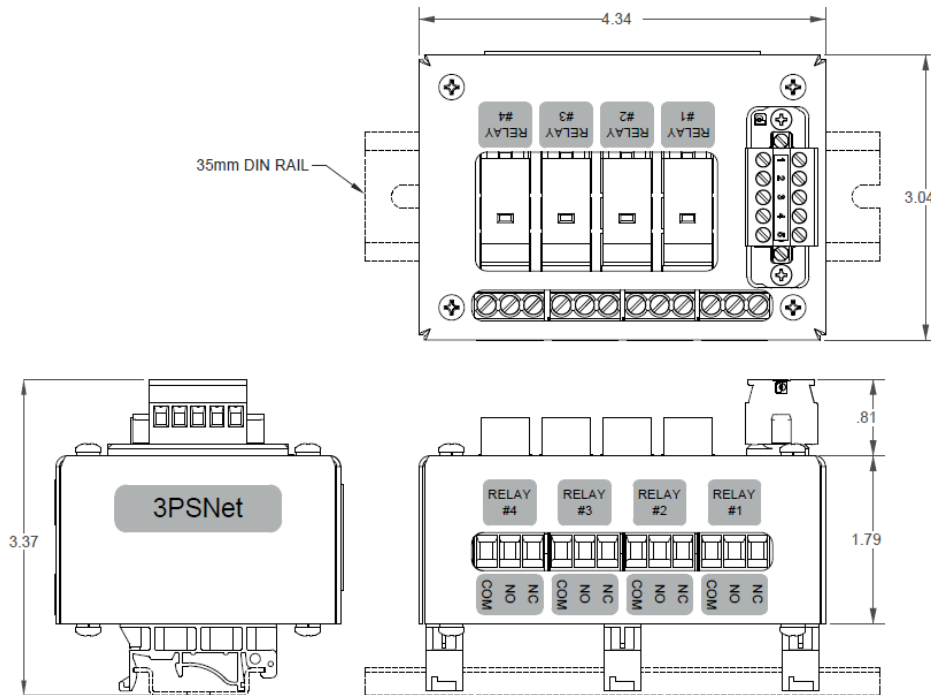


Figure 2 OPD Mechanical Overview

5 Quick Start Guide

The OPD arrives from the factory with the customer application preconfigured per application requested or easily configured by the user. This quick start guide serves as a general startup procedure.

Prior to beginning installation remove all system components from its shipping container(s) and review components to ensure that all are undamaged and correct according to the order placed. All cable connections with the exception of the bare wire terminations are installed by hand with no tools needed. Once the system layout is complete, mount all modules in applicable locations being sure to adequately protect the devices from any environmental conditions that may cause the device to fail. The individual section for each module will provide additional information needed for installation.

Note: device installation locations may be critical for proper functionality for noise avoidance.

5.1 Configuration

If purchased as a system, the OPD will arrive from the factory preconfigured to function per the system drawing notes and application information provided. In the event that the system needs to be configured, the system can be connected to a PC using a TFX230 and configured with the application supplied with the hardware. Once connected, the configuration can be modified using the McCoy Global OPD Configuration Manager application. The figure below illustrates the configuration manager tool that is shipped with the product or supplied by McCoy Global.

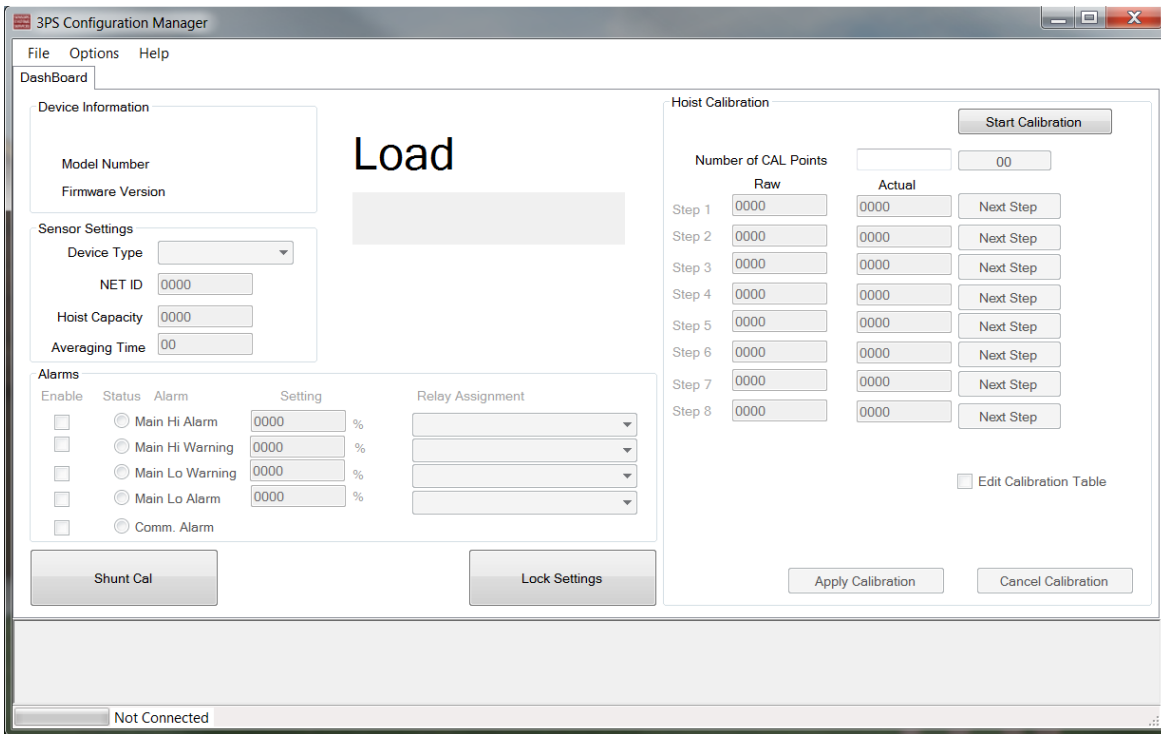


Figure 3 Configuration Management Tool

5.1.1 Connecting to the System

This quick start section shows how to quickly get the Configuration Manager tool up and running to quickly configure the system.

Requirements:

- Laptop with the MGNet Configuration Manager installed
- TFX230
- USB Cable

Quick Start Steps

1. Connect the USB cable to the TFX USB Port.
2. Connect the TFX230 to the OPD.
3. Connect the USB cable to the laptop.
4. Apply power to the system
5. Launch the McCoy Global Configuration Manager tool.
6. Set serial port parameters as below.

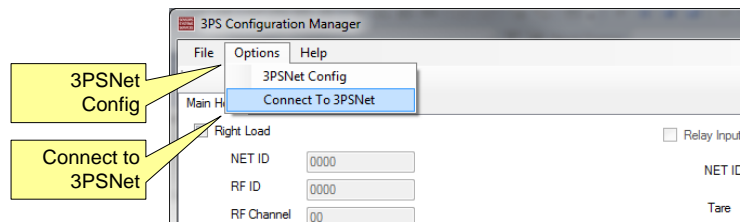


Figure 4 Connecting to a network

Feature	Description
MGNet Config	The MGNet Config menu item launches the Communications Port Settings Pop Up
Connect to MGNet	After port settings have been entered, the Connect to MGNet menu Item establishes communications with the MGNet to USB Gateway.

The Communication Port Pop Up is used to configure the configuration manager to communicate to the MGNet to USB gateway.

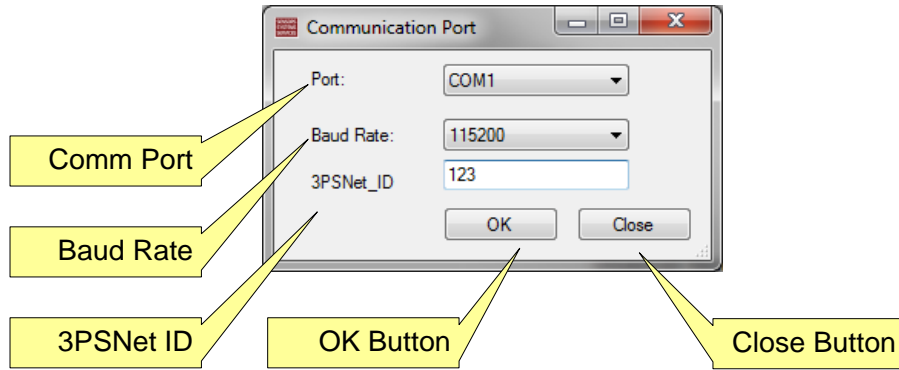


Figure 5 Communication Port Settings

Feature	Description
Comm Port	The Port Drop Down Menu item auto populates with available ports. The user must select the proper port.
Baud Rate	The MGNet to USB only supports one Baud Rate at 115200.
MGNet ID	The MGNetID is the ID of the MGNet to USB Gateway (TFX220). There is a label on the device that indicates the Net ID of the device.
OK Button	Saves the settings and closes the pop up
Close Button	Closes the pop up without saving settings.

5.1.2 Calibration

The OPD offers up to an 8 point system calibration for each hoist. The user can utilize to adjust to display and alarm an accurate load for the sensor. For more information on calibration reference the section on calibration.

6 OPD Hardware Description

This OPD Module acts as the overload protection device for the system. The OPD module reads the information from the load cells and provides alarm outputs in the form of dry contact alarms.

6.1 Relay Outputs

The OPD has 4 relay outputs built in that can be configured to different alarm functions. The relay coils provided can be rated for 12 VDC or 24 VDC depending on the model selected to power the OPD. The outputs of the relays are rated for 120VAC / 30 VDC @ 10 amps.

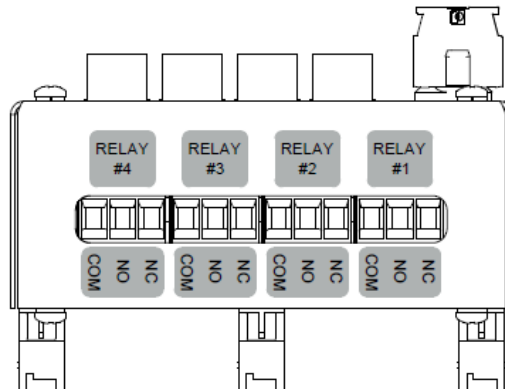


Figure 6 Relay Output Settings

6.1.1 MGNet Interface

The MGNet Interface provides a simple and robust connection for external load devices. The OPD has a 5 pin dual phoenix connector for connecting all signals.

Table 1 MGNet Connector

Pin	Signal	Location
1	+24VDC	<p style="text-align: center;">PIN OUT</p> <p>(RED) +24VDC +24VDC (RED) (BLACK) COM COM (BLACK) (GREEN) DATA-H DATA-H (GREEN) (WHITE) DATA-L DATA-L (WHITE) SHIELD SHIELD</p>
2	GND	
3	MGNet+	
4	MGNet-	
5	Shield	

7 OPD Operational Description

The OPD operates as a standard overload protection device. The functionality of the controller is based on the configuration of the unit.

After power is applied to the system the OPD is in an Idle State. In the Idle State the OPD is waiting to detect a sensor. Once the OPD detects a sensor the state is changed to the Config State. In the Config State the OPD read the information from the Sensor and updates its settings. If the OPD settings are locked, it simply verifies that the sensor is communicating properly. Once Config state verifies setting the OPD changes to the Operating State. In the Operating State the alarm relays are active and monitoring the sensor. If the sensor fails to communicate properly a communications alarm will occur. If the communications error state is detected the alarm relays will fault and the OPD will return to the Idle State until the issue is resolved.

8 OPD Configuration

The OPD is configured using a PC and the supplied cables. The software is also available through McCoy Global Technical Support.

8.1 Main Dashboard

The Dashboard tab provides an overview of the OPD System. It provides Hoist values and alarm status as well as device specific information that is useful for debugging purposes.

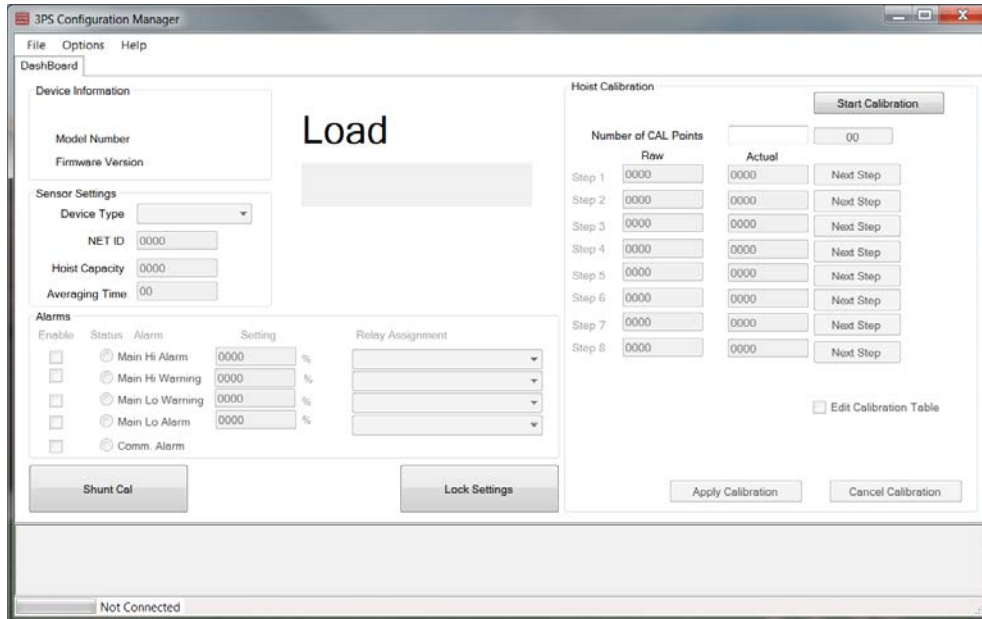


Figure 7 Configuration Tool Details

Feature	Description
Sensor Settings	Sensor Settings are used to identify and configure the communications with the load sensor. Sensor Settings are read from the sensor or may be locked by the user.
Calibration Settings	The Calibration Settings are used to set the calibration of the system. The system supports up to an 8 point calibration.
Output Window	The Output Window shows updated message about system operation.

Connection Status	Shows connection status information when connecting to MGNet.
Port Status	Shows updated port information.
Relay Output / Alarm Settings	Relay Output Settings are used to configure the relay wutputs and the alarm settings. These setting are typically preset at the factory. These settings are defaulted to read only. Checking the check box will enable the write function.

8.1.1 Sensor Setup

When the sensor is plugged into the OPD it automatically identifies the sensor and capacity of the device. Alarm limits are based on percentage and can be adjusted by the user. Once the system configured by the user it is important to lock the setting thought the configuration management tool.

8.1.2 Calibration

The OPD offers up to an 8 point system level calibration. The user can utilize this calibration to adjust the output and alarms to minimize system level inaccuracies.

The screenshot shows a 'Calibration' window with the following elements:

- Start Calibration** button at the top right.
- Number of CAL Points** set to 00.
- A table with 8 rows, each representing a step. Each row has two input fields: 'Raw' and 'Actual', both containing '0000'. To the right of each row is a **Next Step** button.
- An **Edit Calibration Table** checkbox below the table.
- Apply Calibration** and **Cancel Calibration** buttons at the bottom.

Figure 8 Calibration Details

Feature	Description
Calibration Zero Offset	Calibration Zero Offset is used to provide a Zero Offset value to the OPD. This can be used to eliminate system offsets.
Calibration Slope	Calibration Slope is used to set the slope calibration for the system. See the following sections for more information.
Get Calibration	Reads the calibration settings from the OPD.
Set Calibration	Writes the calibration settings to the OPD.

Calibrating a load pin on the OPD is the same as other devices in the portfolio. The OPD, if factory configured, will have a factory calibration pre-installed. If the OPD is not factory configured, it will not have a default calibration.

Note: If load pins are used with the OPD a customer site calibration is required.

The Process for calibration is as follows:

1. Connect to the OPD using the method explained.
2. By default the calibration is set to read only as in the figure below.

Figure 9 Start New Calibration

3. Begin a new calibration by selecting the “Start Calibration”. This will begin a new calibration cycle.

Note: Data taken during the calibration cycle is only stored in the application. No data is written to the OPD until the “Apply Calibration” button is selected.

Note: During Calibrations it is always important to write down calibration information in the event that the information is lost. This will help ensure no loss of data or retesting required.

4. Once the “Start Calibration” button is selected the first step is to enter the number of calibration points. You can select from 2-8 points. The first point should always be a zero point.



The screenshot shows a software interface for entering calibration points. It features a text input field labeled "Number of CAL Points" containing the number "2". To the right of the input field are two buttons: "Start Calibration" (top) and "Next Step" (bottom).

Figure 10 Number of Calibration Points

5. The next step is to start the calibration sequence. The raw value is automatically entered by the software unless the user chooses the “Edit Calibration Table” Checkbox.

	Raw	Actual	
Number of CAL Points	8		Start Calibration
			Next Step
Step 1	-1	0	Next Step
Step 2	0	0	Next Step
Step 3	0	0	Next Step
Step 4	0	0	Next Step
Step 5	0	0	Next Step
Step 6	0	0	Next Step
Step 7	0	0	Next Step
Step 8	0	0	Next Step

Edit Calibration Table

Apply Calibration Cancel Calibration

Figure 11 First Calibration Point

Note: Ensure that the Raw Value is stable and correct before selecting the next button.

6. After selecting next and capturing the zero point lift the load for the next calibration point.
7. Ensure that the load is stable, enter the Actual weight and select “Next Step”.

	Raw	Actual	
Number of CAL Points	8		Start Calibration
			Next Step
Step 1	-1	0	Next Step
Step 2	-1	0	Next Step
Step 3	0	0	Next Step

Figure 12 Next Step

8. After the final calibration step the “Apply Calibration” button will become active.

9. Verify the calibration is correct before selecting the “Apply Calibration” button.

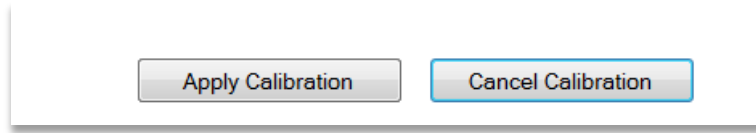


Figure 13 Complete Calibration

Note: The Cancel Calibration button is always available and can be used to stop the calibration

8.1.3 Relay Outputs

This OPD has 4 relay outputs built in that can be configured to different alarms functions. The relay coils provided can be rated for 12 VDC, 24 VDC depending on the model selected to power the OPD. The outputs of the relays are rated for 120VAC / 30 VDC @ 10 amps.

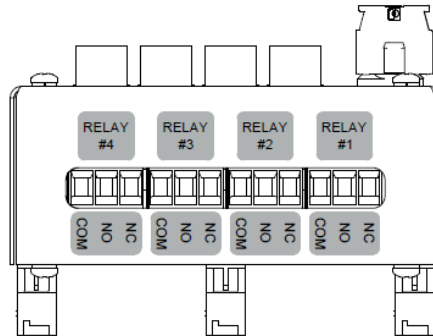


Figure 14 Relay Output Settings

8.2 Alarm Setup

The OPD supports several alarms that can be individually enabled and has configurable alarm values and relay Assignments. The Alarm Page in the configuration tool is used to setup the alarms.

Note: Relays operate in reverse logic for failsafe operation.

Alarms				
Enable	Status	Alarm	Setting	Relay Assignment
<input type="checkbox"/>	<input type="radio"/>	Main Hi Alarm	0000 %	<input type="text"/>
<input type="checkbox"/>	<input type="radio"/>	Main Hi Warning	0000 %	<input type="text"/>
<input type="checkbox"/>	<input type="radio"/>	Main Lo Warning	0000 %	<input type="text"/>
<input type="checkbox"/>	<input type="radio"/>	Main Lo Alarm	0000 %	<input type="text"/>
<input type="checkbox"/>	<input type="radio"/>	Comm. Alarm		

Figure 15 Alarm Setup

9 Specifications

Environmental:

Operation Temperature:	-20 to +65°C
Storage Temperature:	-30 to +85°C

Electrical:

Supply Voltage (See Note 1.)	8 – 30 VDC
Supply Current	200mA max
Transient Voltage Protection	
Reverse Polarity Protection	
RFI Filtered	

Note 1: Designed for either 12 or 24 volt nominal operation.

Mechanical:

Enclosure dimensions	3.1" w x 4.4" h x 3.4" d
Materials	Plastic
Weight	<2 lbs.

Reference A – Option Matrix

The part number matrix below outlines the part number configuration for the OPD. It has configurable options that can be selected at the time of ordering and will drive the build configuration.

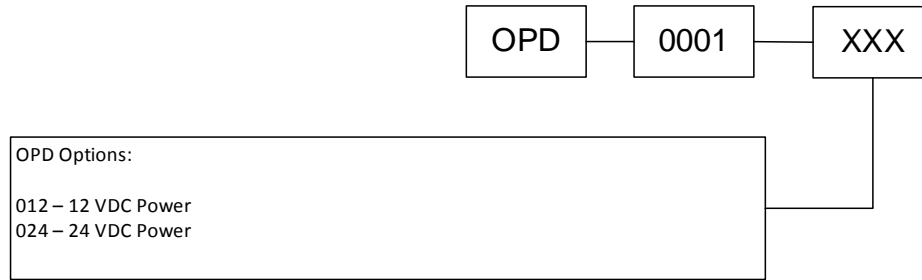


Figure 16 Configuration Options

Reference E – Warranty Requirements

McCoy Global (the “Company”) warrants the products or parts it manufactures against defects in materials and workmanship as follows:

- For a period of 18 months from time of shipment, or 12 months from date of installation, whichever comes first and provided the products or parts have been paid for and stored, handled, installed and used under proper conditions.
- The Company’s liability under this Warranty Policy shall extend to the repair or replacement of a defective product or part only, at the Company’s option.
- All Warranty work is to be performed at the Company’s facilities.
- Products or parts being returned under this Warranty Policy are to be returned freight prepaid to the Company, and the Company will return the product or part to the customer freight prepaid.
- No field service is included. Field service work can be performed at the rate published by the Company and in the Company’s sole discretion.
- The Company reserves the right, in its sole discretion, to make all determinations as to whether or not work requested is covered by this Warranty Policy.
- The Company’s liability will be no more than the amount the customer has paid for the product or part that is the subject of a claim. This is the maximum amount for which the Company is responsible.
- During the Warranty period, the Company will, at its sole discretion, repair or replace defective products or parts for the customer, or refund the amount paid for the product or part less depreciation, upon its return to the Company. The Company reserves the right to refund the purchase price as its exclusive Warranty remedy.
- The Company shall not be liable for and does not assume any responsibility for loss of business or any indirect, incidental, special or consequential damages suffered by the customer or any subsequent buyer.
- TO THE EXTENT PERMITTED BY LAW AND EXCEPT AS SET FORTH IN THIS WARRANTY POLICY, THE COMPANY DOES NOT MAKE, AND SHALL NOT BE DEEMED TO HAVE MADE, ANY OTHER REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, TO THE CUSTOMER OR BUYER OR ANY OTHER PERSON OR ENTITY REGARDING THE PRODUCT, PARTS OR ANY OTHER MATTER. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED REPRESENTATIONS AND WARRANTIES RELATING TO THE PRODUCT, PARTS OR ANY OTHER MATTER, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED REPRESENTATION OR WARRANTY AS TO THE QUALITY, MERCHANTABILITY, SUITABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE, OR NON-INFRINGEMENT OF OR WITH RESPECT TO THE PRODUCT OR PARTS, WHETHER USED ALONE OR IN COMBINATION WITH OTHER MATERIALS, PRODUCTS OR SUBSTANCES.
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