

	Doc or ECO #:	ECO-70503-004	Date:	10/2/2020	Author:	JK
	Rev. #:	A				
Engineering Change Order (ECO)	Engineering Approval:	Aeg	Date:	10/2/2020	Quality Approval	aeg

P/N #:	70503	Effective Date:	October 2, 2020
Title:	Thruster Diaphragm Update		

1.0 Purpose / Summary

Gasketing Adhesive was found to displace the thread locker and cause the diaphragm sub assembly to come apart during the oil filling operation. The gasketing adhesive and thread locker were replaced with Permabond 735.

The Oring on the diaphragm sub assembly was replaced with softer and larger cross section Oring to eliminate leaks.

Oil Dye switched from red to florescent red to improve leak detection.

5 Pin whip leaks were causing a high scrap rate, a resin backfill process was added to the whips during assembly to stop the leaks.

Update Label to include QR Code and Module Description.

2.0 Parts Affected

Part Number	Notes	Removed	Added	Modified	REV
70471	Remove from Assembly	☒	☐	☐	-
70503	Sub Assembly Updates, Oil Dye Change, Add Label	☐	☐	☒	F
70750	Replace Gasket Adhesive with Permabond 735 and Tef-Gel	☐	☐	☒	D
71461	Replaced with 72303	☒	☐	☐	-
72301	Add new larger softer oring	☐	☒	☐	COTS
72303	Add florescent red dye	☐	☒	☐	COTS
TG-01	Add to assembly	☐	☒	☐	-
50011	Add to 70750 Sub Assembly	☐	☒	☐	-
71463	Replace red dye with florescent dye	☐	☐	☒	B
70752	Add Whip Potting	☐	☐	☒	B
72984	Add to assembly	☐	☒	☐	COTS

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3.0 Detail

In response to an increase in diaphragm assembly leaks on assembled thrusters in inventory Gasketing Adhesive **[71315]** was added to all three interfaces of the diaphragm in the Thruster diaphragm sub assembly. After a short period of success, the gasketing adhesive was found to displace the thread locker and cause the diaphragm sub assembly to come apart during the oil filling operation. The remediation is to replace the gasketing adhesive with PermaBond 735 **[50011]** which was tested and found to effective in place of both the gasketing adhesive and the thread locker.

It was also discovered that leaks were developing through the threads, tefgel, and oring where the M5 Thruster 2.0 Front Diaphragm Sub Assembly **[70750]** connects to the M5 Thruster 2.0 Main Tube **[70458]**. 1.5mm x 30mm 70A Buna-n Oring **[70471]** was replaced with 019 50A Buna-N Oring Soft **[72301]** which is both softer and has a larger cross section to improve sealing capability.

Oil leak detection on the thrusters can be difficult to see in confined spaces like the diaphragm interfaces and inside the connector, significant amounts of oil are required to visually identify. By replacing Kingscote 506250-R16 Red B Leak Tracer Dye (4 oz) **[71461]** with Kingscote 506250-RF4 Red Fluorescent Leak Tracer Dye (4oz) **[72303]** and using a UV light very small leaks are easy to see. This will allow for earlier detection because smaller amount of oil is required to confirm the presence of a leak.

Manufacturing defects and the insufficiency of the silicone water block in M5 Male Female 5 Pin Whip **[70008]** caused as many as one in ten thrusters to form oil leaks in the connector. To eliminate the scrap rate due to whip leaks Potting 3M Scotchcast 2123 (ml) **[71474]** is backfilled with a vacuum pressure cycle into each whip before assembling the thrusters. This process forms a robust and lasting oil block in the whip.

Brady ID B-434 Labels 0.75" x 1.5" **[72984]** with QR Code and module description was added to improve label quality and to meet customer requirements.

4.0 Disposition of Material

All current in-house stock has been reworked at time of publication.

5.0 Action Items

Action	Department	Acknowledgement Initials
Update Part Revision in Epicor to match Drawings	Purchasing	AG
Build M5 Thruster 2.0 Assembly [70503] to conform with the ECO	Production	KK

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6.0 Modified / Referenced Documents:

Document	Current Revision
WI-70503	F

7.0 Revision History

Date Revised (mm-dd-yyyy)	Location of Change (section, paragraph no., step no., etc.)	Description of Change Made	Name of Person making the Change
10/2/2020	-	Initial Draft	JK