

24 November 1981

To All Participating Repair Stations:

The attached service bulletin will be sent this week to all owners of Raven HP-II high performance balloon burners. You will note from reading the bulletin that it requires installation of flow-restricting "push-checks" in the burner pressure gauges. We feel this procedure is something that should be done only by a certified repair station or aircraft mechanic, or at least signed off by same. We wish to provide this retrofit to Raven owners at no charge to them, by making payment for the work directly to you, the repair station. This is the first time we have attempted a field retrofit at no cost to the owner; we're glad there's a reliable network of facilities to work with. With your help, we're confident that the system will work well.

We've visited with several repair stations who unanimously felt the retrofit was fairly simple and would not take long to perform. Our own technicians took about 15 minutes per burner when they started installing push-checks. These same repair stations felt that our offer of \$10.00 per push-check installed was adequate compensation for their efforts. We hope you feel the same.

Our plan is to have you sign a compliance card with the owner's name and burner serial number on it, and return it to us as authorization for payment. Upon receipt, we'll send you \$10.00 for each push-check installed; that's \$20.00 for each HPDII you work on. The push-checks are being sent out to the owners along with the service bulletin and compliance card, but we've enclosed two extra push-checks so you'll know what we're talking about. Please keep them for spares; supplies are tight on these because they're a special run. If owners lose theirs and you need extras, let us know.

Some tips on installation...the liquid sealant with Teflon is a very good idea, since it's difficult to get at the gauge threads with Teflon tape. Also, we've found that socket drive extensions are quite useful for driving the push-check into the gauge. Since it doesn't take much force, you can place the extension right atop the push check, and tap lightly directly on the socket end of the extension with a small hammer to drive the push-check in. If you use a punch to further recess the push-check, the socket end of the extension can be placed over the punch and "spliced" onto the

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punch using electrical tape. Then you tap lightly on the other end. A 1/8" punch is recommended; smaller ones may damage the push-check and defeat its purpose.

It is important that all owners comply with this service bulletin within the specified time period (On or before February 28). Anything you can do to make sure all burners in your area are modified will be much appreciated. Thank you for your cooperation. If you have any questions, please let me know.

Best regards,

RAVEN INDUSTRIES, INC.

A handwritten signature in dark ink, appearing to read "P. J. Cannon", is written over the typed name.

Pat Cannon
Engineering Manager
Applied Technology Division

PJC:bam
Encl: Service Bulletin 113
Letter to Balloon Owners

* * * IMPORTANT - PLEASE READ THOROUGHLY * * *

24 November 1981

RE: Raven Service Bulletin No. 113

Dear Raven Owner,

This letter is to alert you to a potential problem which we feel exists in the pressure gauge of your balloon burner. We've made arrangements for you to have the problem corrected at no cost to you, but you must take the initiative to do so. Please do not ignore this message. If you are no longer the owner of this balloon system or burner, please write the name and address of the new owner on the compliance card and drop it in the mail.

Here's the problem:

The pressure gauge mounted in the base of the HP-II burner is a U.S. Gauge Co. type P-562U gauge, which is assembled using a fusible solder joint within the gauge. This solder joint will melt at approximately 360°F. As you probably know, the base of your burner never gets that hot during normal operation. However, we've determined that under certain conditions, especially if a propane fitting is loose and leaking elsewhere in the burner, there could be enough heat present to soften the solder and cause the gauge to leak. We stress that at this time, we have no reports of gauges failing during free flight; however, we've decided that the problem is potentially serious enough that we want to correct it just in case. A failure of the gauge solder joint during flight could cause a substantial propane leak at the base of the burner. That's why action must be taken on this service bulletin by February 28th, 1982, or within 10 hours of flight time; whichever comes first.

Here's the solution:

The gauge manufacturer has provided us with tiny brass thimbles which are to be installed in the gauges. These thimbles are called "push-checks" and are to be pressed into the back of the pressure gauges as shown in Figure 1 of this service bulletin. The push-checks have a very small hole in them (.006"), made by a laser beam, which will allow only enough propane movement


within the gauge to permit pressure readings. Our tests show that when the pressure gauge solder joint is intentionally melted out using a hand torch, the resulting leak with a push-check installed amounts to only a very small mist of propane. If ignited, this will produce a small flame which is well contained within the burner. Apologies to you do-it-yourself types, but the installation of push-checks in gauges must be performed by, or signed-off by, a certified repair station or aircraft mechanic.

THIS IS ALL YOU HAVE TO DO:

1. Contact your local repair station, or a certified aircraft mechanic, and arrange to get your burner to them. We've already alerted the balloon repair stations on the enclosed list, so they're expecting you.
2. Take the enclosed compliance card, which has two push-checks attached, along with your balloon logbook, to the person doing the work, and have the push checks installed in your burner.
3. Have the person who installed the push-checks sign the card, and also make an entry in your logbook. They will then drop the card in the mail. THIS STEP IS IMPORTANT - it documents that the installation has been performed.
4. Enjoy your Raven balloon system; thanks to your cooperation we feel it's the best - and the safest - in the world!

Best regards,

RAVEN INDUSTRIES, INC.



Pat Cannon
Engineering Manager
Applied Technology Division

PJC:bam

P.S. Don't forget! Work must be completed before 10 more hours of flight time or prior to February 28th. This is a no cost retrofit for you provided it is accomplished by February 28th and your repair station returns the signed compliance card before March 31st.

INSTALLATION OF "PUSH-CHECKS" IN HP-II BURNER PRESSURE GAUGES

NOTE: This service bulletin applies to ALL Raven HP-II 12 million Btu burners shipped prior to November 3, 1981. The HP-II burner is characterized by the "S" coil nozzle, 1/2" stainless steel tubing, and a watertight base tray with rounded corners, in which the pressure gauge is mounted. A drawing of the HP-II burner is attached.

Actual serial numbers affected include:

Double Burners: HP2D-101 thru HP2D-371
 HP2D-373 thru HP2D-386
 HP2D-388 thru HP2D-393
 HP2D-398, HP2D-399, and HP2D-407

Single Burners: HP2S-101 thru HP2S-122
 and HP2S-124

Rally Burners: HP2R-101 thru HP2R-272
 HP2R-274 thru HP2R-286

The pressure gauge used in the above burners may leak and create a hazardous fire if a solder connection inside the pressure gauge becomes hot enough to become unsoldered. Under normal circumstances, the solder connection temperature is well below the melting point of the solder; however, if there is an existing fuel leak in the plumbing at the base of the burner or if the burner flame is distorted downward as might happen during windy tether operations, the solder connection may have its temperature raised above its melting point. If this happens, the pressure gauge will leak enough fuel that a potentially hazardous fire may result. To eliminate this hazard, a "push-check" should be installed in the burner pressure gauges. The push-check has a very small hole in it which will limit fuel leakage to a non-hazardous level in case the pressure gauge solder connection is melted.

A qualified repair station must install the push-check in the burner pressure gauge within 10 flight hours or 90 days. The procedure is as follows:

NOTE: Refer to Figure 1 (attached) for component location and identification.

Suggested tools include: Hammer, 20" socket drive extension (or combinations of shorter extensions) 7/16" "crow's foot" socket attachment, 9/16" socket, and liquid Teflon pipe sealant.

1. Loosen the ferrule nut which connects the 1/8" diameter copper tube to the female connector located on the back of the pressure
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gauge. Use a 7/16" "crow's foot" attachment and ratchet drive extension on the ferrule nut. Lift the loosened nut off of the female connector, and pull the 1/8" diameter copper tube out of the female connector; it may be necessary to "rock" the 1/8" tube back and forth slightly to do this. Carefully bend the copper tube and ferrule nut to one side. Bend the tube only far enough to allow removal of the female connector and not more than 1".

2. Remove the female connector by using a 9/16" socket and extension.
 3. Position the push-check on the fuel inlet of the gauge as shown in Figure 1. Next, the push-check is to be driven into the inlet. A 1/8" drive punch may be used, but smaller diameter punches must not be used, since these may damage the push-check and defeat its purpose. A proven method is to place the snap-on end of a socket drive extension directly atop the push-check, and then tap lightly on the socket end using a small hammer. The push-check must be at least flush with the top of the opening when installed, and may be slightly recessed (up to about 1/16").
 4. Remove the old thread sealant from fittings. Apply new thread sealant to the male threads of the pressure gauge fitting, leaving the first thread free of sealants. Recommended thread sealant is a liquid type with Teflon such as Loctite High Performance Pipe Sealant with Teflon. Because of the location of the pressure gauge, the liquid thread sealant will be easier to apply than Teflon tape. Install the female connector on the back side of the pressure gauge. Avoid overtightening which may distort the gauge housing or shear the gauge mounting screws.
 5. Install the ferrule nut and 1/8 inch diameter tube.
 6. Pressurize the burner and inspect for leaks
 7. The repairman must sign the owner's compliance card, including repair station address and forward to Raven for payment.
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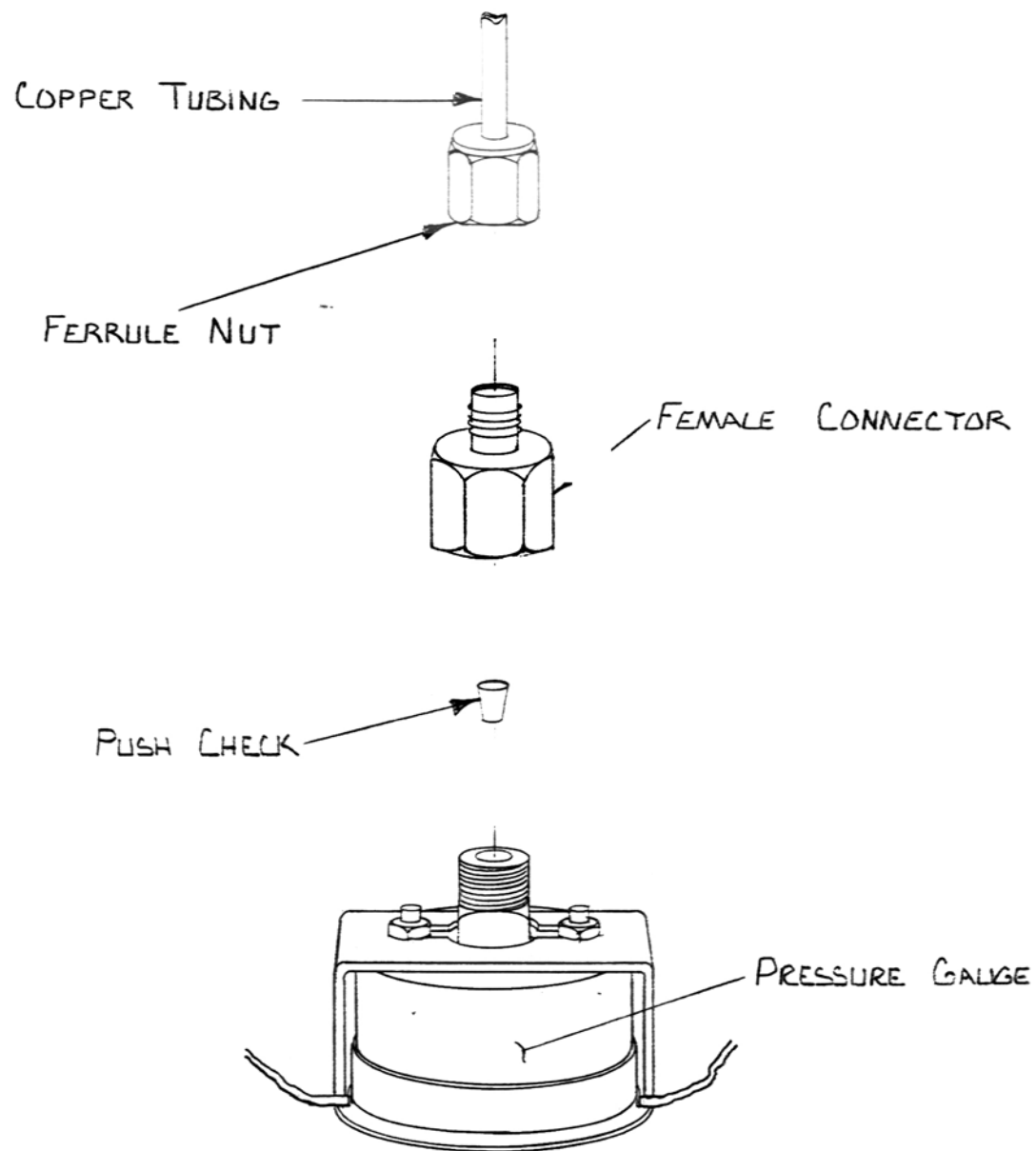


FIGURE #1

Pressure Gauge Retainer Nuts

Pressure Gauge

1/8" Copper Tubing

Copper Aspirator Tube

Nozzle Coil

Coil Windings

Coil Support

Square Tube

Nuts, Bolts & Washers
For Coil Supports

Nozzle Coil Fastener Bolts

Pilot Light

1/8" Copper Tubing

Reducer

Hex Nipple

Bulkhead Adapter

Blast Valve Hold Down Bracket

Fuel Inlet Fitting

Burner Shield

Pop Rivets

Burner Base Screws

Pilot Valve

Metering Valve Handle

Blast Valve

DRAWN		RAVEN industries, inc. SIOUX FALLS, SOUTH DAKOTA	
CHECKED			
DESIGNED		TITLE HP II BURNER	
MTG			
G.C.		CODE INVENT NO. 14979	
STRESS FOR REDUCTION		SIZE B	DRAWING NO.
NO. APPROVED PLANS		SCALE	SHEET
CONTR. NO.		WT	