DISCUSSION PAPER
Possible Options for Installing a Raymarine Linear Drive in a Hunter 356
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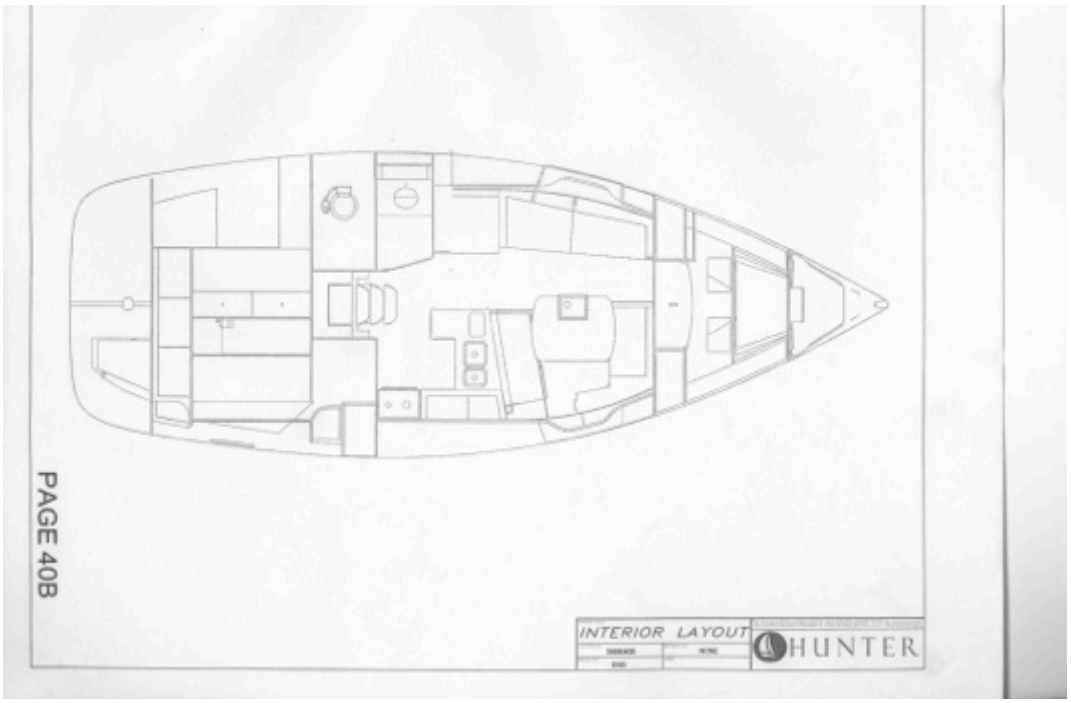
This is a summary of what I have found/deduced so far in relation to installing a Raymarine Linear Drive in a Hunter 356. THIS IS BY NO MEANS PROVEN AT THIS STAGE SO THESE IDEAS SHOULD NOT BE TAKEN AS RECOMMENDATIONS.

Comparison of 356 model to 36 model

The pamphlet "36 Electrical Stage Autopilot", (see the Forum for a copy) provides a starting point for considering options for the 356, but it is still unclear how similar the two models are. They do share the same hull, but there may be some differences to the deck and internal structures, and there has been some discussion on the Forum about the rear bulkhead which separates the rear cabin from the transom lockers. It is this bulkhead where the linear drive (LD) has been mounted on the 36 in the pamphlet. The 356 does have a similar bulkhead – see the scanned image from the 356 manual below.



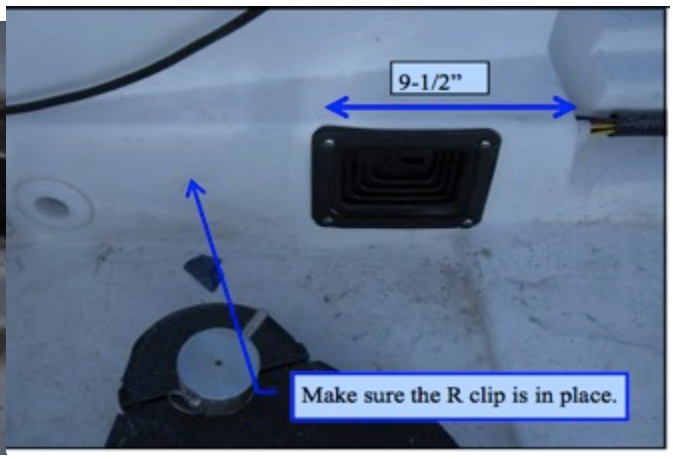
The bulkhead is the line across the rear of the rear bunk. The following is a photograph of part of this bulkhead in my 356.

Bottom of cockpit locker

The mounting bracket of the LD in the 36 pamphlet was attached to the top of the bulkhead where it rises up to be hard against the bottom of the cockpit locker (top LHS of photo). The pushrod end emerged into the cockpit aft of the stepdown and just forward of the bilge pump outlet at the top RHS of the photo (also see 36 pamphlet). It is therefore possible that the LD could also be mounted here in the 356, but I have separately drawn these structures etc to scale, and it would be a tight fit, and I think the angles that the arm emerges may be difficult to link with the tiller arm, and may exceed some tolerances. But this is unsure until I get and try to fit a LD.

<u>Structures under the cover panel in the cockpit floor</u>

There is one significant difference between the photos in the 36 pamphlet with my 356. If you look at the following photos, you will see the difference in the side of the underfloor area above where I have placed the ruler. Notice the difference in the position of the step down in relation to right hand edge of the ruler in the 356 and RHS of the blue arrow in the 36. The position of the bulkhead in my 356 is shown by the vertical shaded pencil marks just above the stepdown.



Above - my 356 above left, and the photo of the 36 from the pamphlet right.
Also see pictures of the 356 below for a wider view of this area on the 356, and see similar shots of the 36 in the pamphlet.

If the cutout for the pushrod on the 36 (see above pic) was put in the same place on the 356 relative to the tiller arm, then it would need to be aft of the 9 ½ inch mark. I therefore believe, that the position of the bulkhead under the floor must be where the stepdown occurs in both boats. It is unclear how the side structures and deck plan differ between the two models. Perhaps a 36 owner may be able to give some ideas. I will put a scanned copy of the overall deck plan for the 356 at the end of this article for comparative purposes.

Length of Tiller Arm

This is an important consideration, as it will determine where the linear drive can or cannot be mounted. Raymarine recommend that the tiller arm should be 250 mm or 10 inches long. From the pictures in the "36 pamphlet", it appears that the tiller arm for the linear drive used there is the same length as that linked to the pushrod on the helm, i.e. 200 mm or 8 inches.

The following photos show where the tiller arm would be positioned at the port, starboard and central rudder positions in my 356. The ruler protrudes 250 mm. Take off 50 mm for the shorter length.

(Sorry about the dirt – I only recently bought the boat and obviously the panel hadn't been removed for some time. There were 6 large spiders under the panel!!)

Note that the 200 mm mark is about where the floor steps down, so that is consistent with the position of the tiller arm in the 36 pamphlet as discussed above.

Alternative Options to mount the LD

These options would require the LD to be mounted on a vertical extension of the bulkhead up into the rear cockpit lazarette, requiring some of the lazarette to be cut out. I am also assuming that the LD would be mounted sideways. This seems to be what was done in previous installations in the 356, as shown below from photos recently sent to me by Hunter.

I believe these may actually be the photos of Jerry Clark's boat, or one modelled on the method used by Jerry (please refer to Jerry's photo in his earlier post showing the enclosed box around the drive). This method would overcome the tightness of fit, and difficult angles etc I mentioned earlier for the LD to be mounted on the rear of the bulkhead, but UNDERNEATH the lazarette. The two bolts shown protruding in the lower photo would have a matching pair under the floor of the lazarette, for the mounting bracket of the LD shown in the centre photo.

I think there is another option, and that is to mount the LD on the forward side of the bulkhead extension, and a bit higher up. This would allow the pushrod to attach to a tiller arm of the recommended length of 250 mm. There is a slight potential problem with this as the end of the tiller arm might clash with the main tiller pushrod when the rudder is hard over to port (see photos on page 3). However, there may be a large enough a gap under the main pushrod as shown in the following picture, to accommodate the connections between the arm and LD pushrod.

Wherever the LD is mounted, there must be sufficient space around the body of the LD to allow it to swing through the arc that the tiller arm traverses.

CONCLUSIONS

I now believe that the LD would most appropriately be mounted on a vertical extension of the rear bulkhead up inside the rear portside cockpit lazarette. Whether to mount in on the fore or aft face of the bulkhead is the vexed question, and this will essentially depend on the length of the tiller arm.

The "V" shaped tiller arms shown in the pictures all seem to be factory made specifically for the purpose of fixing a linear drive. I am not sure if these arms are still available. If not, I have a picture of one made out of stainless steel which is screwed or bolted onto the top of the existing tiller arm. This seems as if it should be OK (see photo at end of document).

I have enquired with Raymarine about whether the LD would work OK with the shorter arm and their response was "Reducing the recommended length of the lever will put more strain on your drive unit and make your steering response less smooth, I can't recommend it but that doesn't necessarily mean it won't work."

Does anyone have any personal experience on this issue of tiller arm length?

Unless I can be fully convinced that the shorter tiller arm is OK, I am now leaning towards using the longer 250 mm tiller arm, and have this fabricated locally in stainless steel. I would then mount the LD on the forward face of the extended bulkhead up inside the rear cockpit locker at a height appropriate to match the height of the tiller arm (this can also be bent a little to ensure it doesn't rub either on the floor or the main pushrod).

There is another element to this discussion perhaps, and that is the use of a rudder locating device. I am informed that the system functions OK without one, but that it is more efficient if one is installed. I notice that most of the pics have this installed. Perhaps this may help overcome potential reduced efficiency using the shorter tiller arm???

Obviously, until I actually procure a LD unit, I cannot be totally sure whether all these options may work out in practice, as tolerances appear to be fairly minimal.

I also note and acknowledge the recent post from Nick who has suggested mounting the LD in the under-floor space in the cockpit. I would have to look much closer at this option before commenting. One of the problems might be to protect the LD from moisture. Raymarine certainly indicate that the LD unit must be mounted in a dry area.

I would welcome any feedback, pointing out obvious (or not so obvious) errors etc.

FOR DISCUSSION ONLY AT THIS STAGE. THESE ARE NOT RECOMMENDATIONS AND I TAKE NO RESPONSIBILITY FOR ANY OPTIONS DESCRIBED ABOVE.

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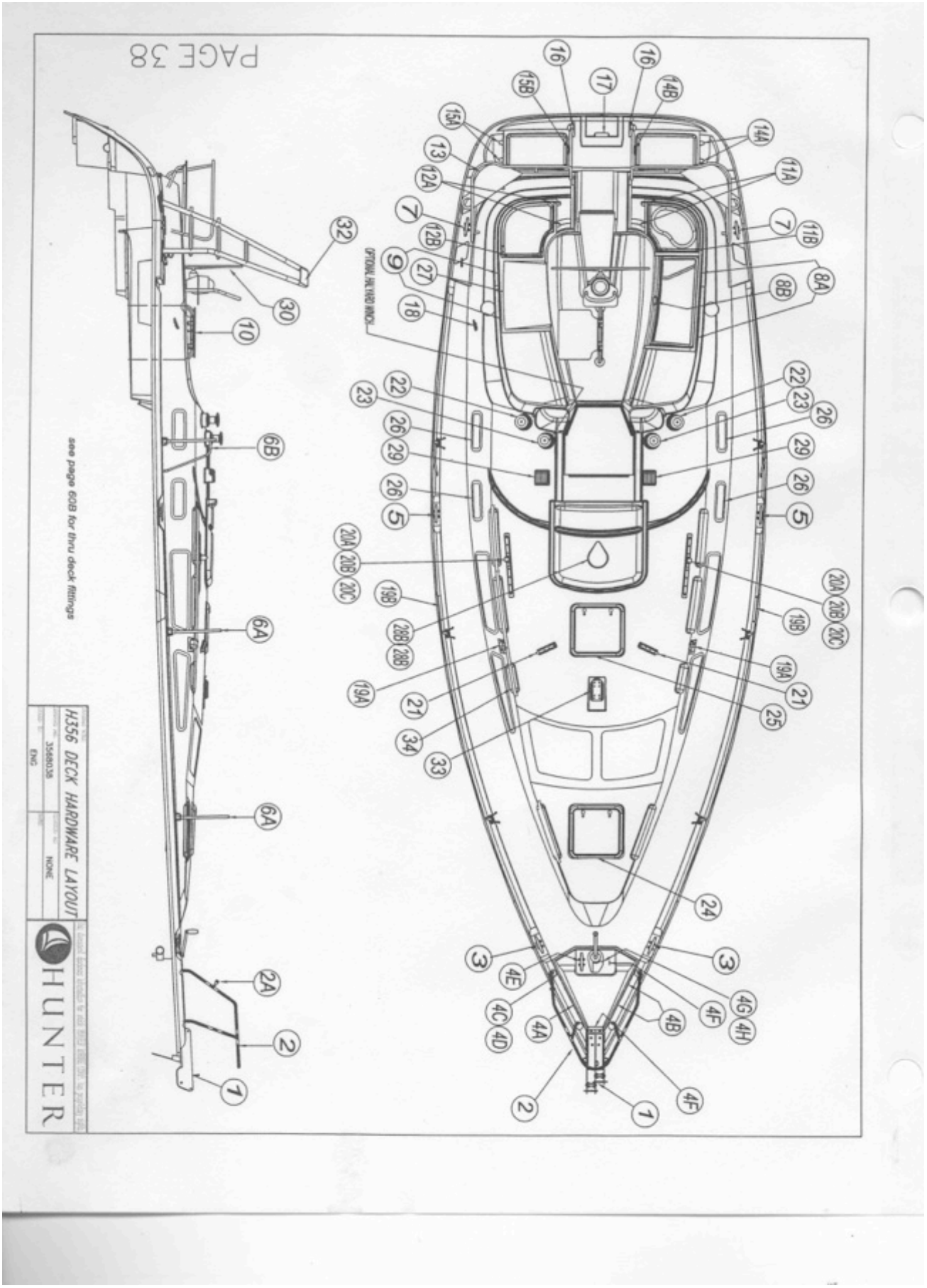
Deckplan of the 356



The rear bulkhead goes across the hull under the step shown in the exposed cockpit approximately where you would draw a line between the two circled number 7s.

This is a tiller arm fabricated for a LD, and screwed or bolted onto the existing tiller arm. I found it on the Forum site somewhere, but have lost the link to it. This picture also seems to indicate that the LD may have been mounted at the rear of the rudderstock. I can't remember what the actual boat model was. I'll try to chase it up.