

**RMYoung 27600 firmware and wind dir error
Originated by Phil White on March 20, 2013**

From: Phil White (NOAA) on Wed, 20 Mar 2013

Greetings All,

An R.M. Young service rep reported (after we bought a replacement 05106 wind bird) that 26700 translators with firmware versions older than 4.7 will return a value of 358 when direction varies rapidly on a mechanical wind bird. The rapid movement of the vane results in a rapidly changing voltage from the potentiometer and is interpreted by the translator as an error and sends 358 as an error flag (why use a valid number as a flag?).

On the NOAA's Oscar Dyson the mechanical wind bird on the jack staff whips around when the wind is on the stern due to the interference of the massive superstructure. I'd never seen this before as most ships I've sailed have wind birds on the main mast and don't routinely see this kind of turbulence.

The first attached shows the relative wind swinging around slowly and gets noisy when the wind is + - ~40 deg of 180. The straight line of 358 readings at the top (red arrow) is a random but frequent logging of the "error" value.

This can be a problem even if it occurs rarely and you use instantaneous readings. For SAMOS and other users of average values it will drag your averages around. Instantaneous true wind calculations will show regular ghost values as if the wind was from two different directions (see second attached).

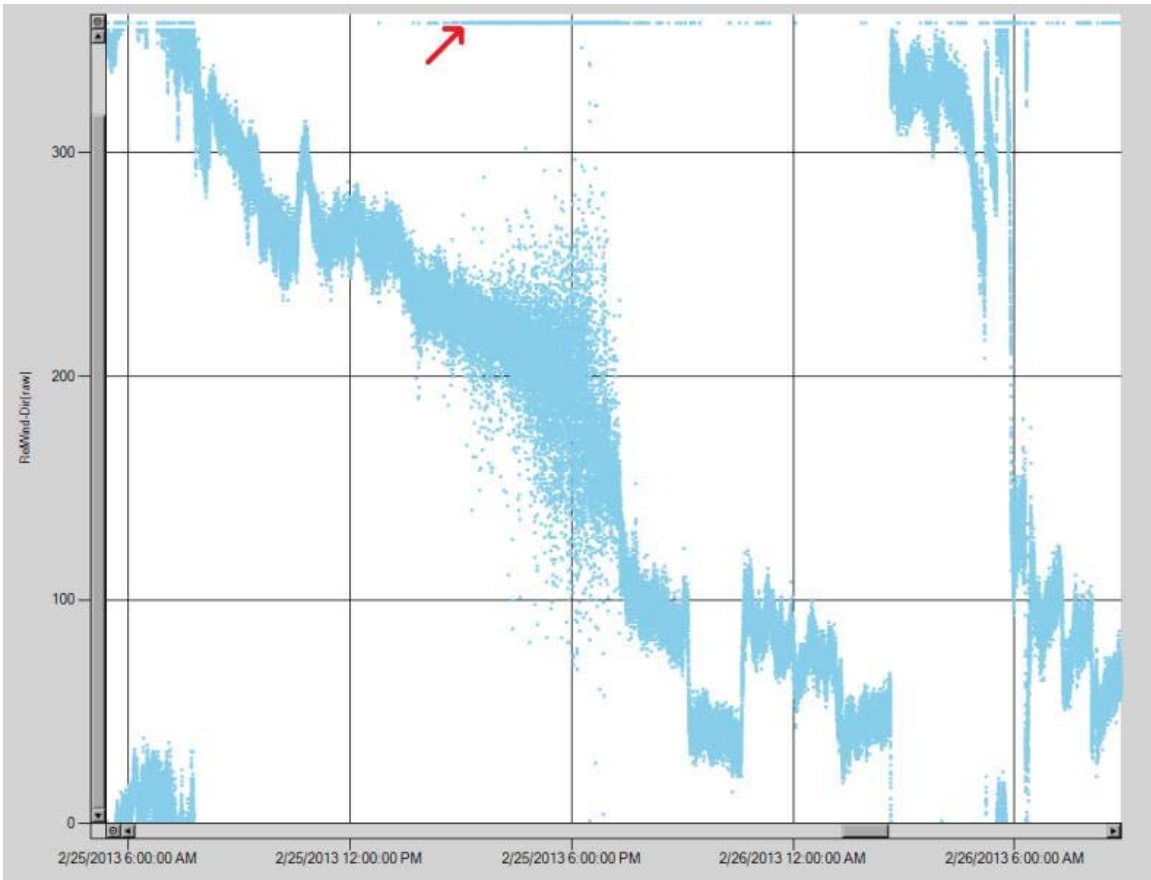
This is apparently not a problem with the 26800 translators, later 26700s or ultrasonics.

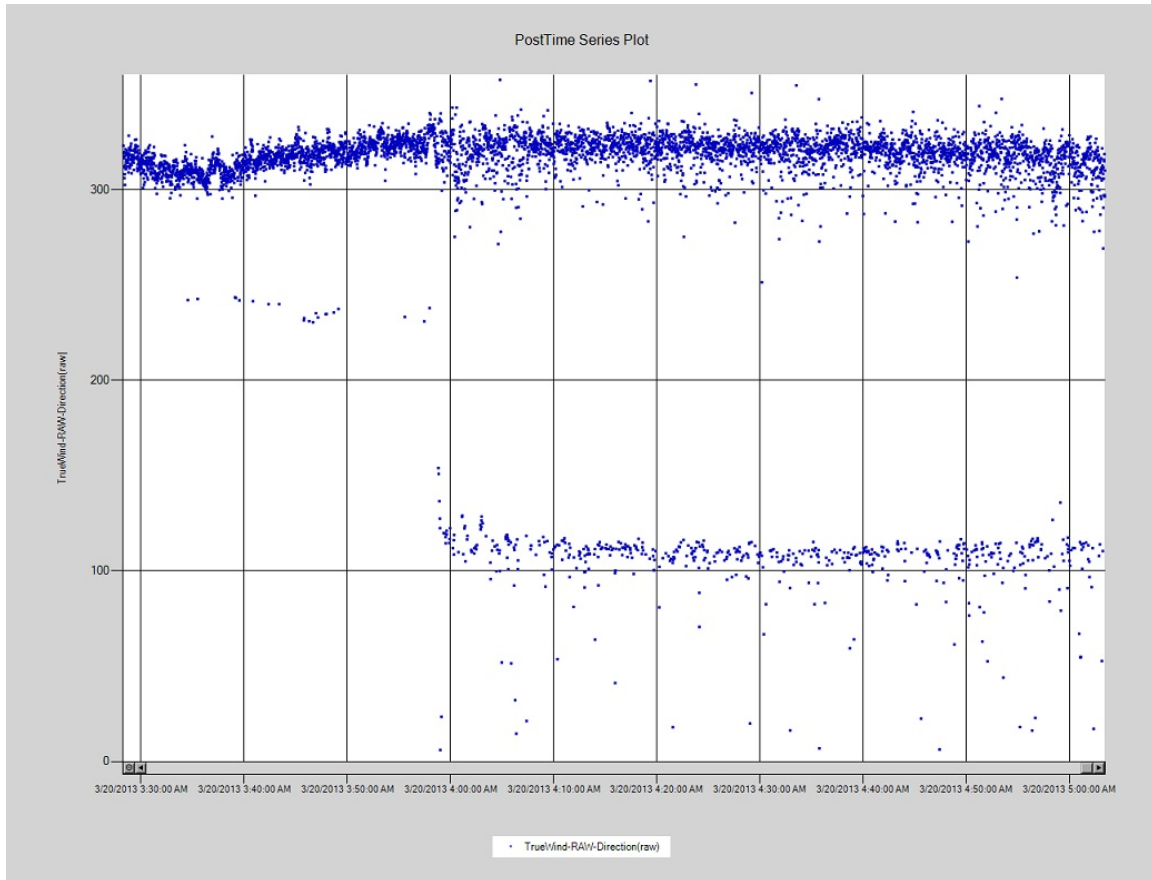
Anyone else seen this?

Cheers,
Phil

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Phil White  
Chief Survey Technician  
NOAA Marine Operations Center  
2002 SE Marine Science Drive  
Newport, OR 97365





**Reply From: Thomas Wilson (SUNY – Stonybrook) on Wed, 20 Mar 2013**

Hi Phil et. al.,

I believe have an answer and a solution. The RM Young windbirds have a directional "dead zone" from approximately 355 to 360 degrees. The mechanical potentiometer wiper first hits one resistive element end pad where there is no change in resistance with a change in direction, then there is a sector where the wiper is disconnected from the resistive element completely, then the other end pad for another sector where there is no change in resistance with change in direction. As can be seen from this lovely cal report, 358 degrees is right in the middle of the open circuit part of the dead band:

[ftp://ftp.nodc.noaa.gov/nodc/archive/arc0040/0078573/1.1/data/0-data/vessel/Ship\\_Sensor\\_Raw\\_Data/SCS\\_Data/Calibration%20Documents/Met/Windbird%20SCS\\_82711\\_112410.pdf](ftp://ftp.nodc.noaa.gov/nodc/archive/arc0040/0078573/1.1/data/0-data/vessel/Ship_Sensor_Raw_Data/SCS_Data/Calibration%20Documents/Met/Windbird%20SCS_82711_112410.pdf)

I'm pretty sure that the 26700 translators have a pullup or pulldown resistor on the wind direction wiper input, resulting in a raw reading of 360 or 000 for any position in the deadband (at least that's the way I would have designed it). My last 26700 got fried by a lightning strike a couple of years ago, but if you want to be certain just disconnect the wind direction input and see what the box reads.

OK, that's the answer. The solution is to flag a raw relative wind output of 358 from the 26700 as a "no data" message - because it is. Complexities of allowing for alignment correction inside the translator etc. are left as an exercise for the student 😊

"It's not a bug, it's a feature!"

Hope this helps,  
Tom

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**Reply From: Phil White (NOAA) on Wed, 20 Mar 2013**

Thanks Tom,

That's what I first suggested more or less to the RM Young folks. I suspected a bad spot in the resistive element or a bad wiper that picked up the pen more or less when moving rapidly returning the reference voltage or whatever is on the end pad. I like your test. Busy now but I'll give it a try at the end of the month.

Thanks again,  
Phil

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**Reply From: Thomas Wilson (SUNY – Stonybrook) on Wed, 20 Mar 2013**

Reading my post again, I may not have connected the dots sufficiently. I think that the older 26700 firmware deliberately returns a wind direction of 358 when the standard deviation of the raw direction readings is so high as to make a single number meaningless. Since a real windbird would never read direction of 358 because of the physical dead zone, it is a reasonable (if poorly documented) way to flag bad direction data coming from a windbird.

To test this hypothesis: 1) a 26700 translator with the windbird direction lead disconnected should read 000 or 360, 2) a 26700 translator with a windbird that is spun around and around in direction fast enough for long enough should read 358 for direction.

Tom

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**Reply From: Thomas Wilson (SUNY – Stonybrook) on Thursday, 21 Mar 2013**

Thanks for the compliment Phil.

So far as "flashing the firmware" my 26700 is old school with a socketed EPROM so it's more like "plugging the firmware". Those were the days - first go looking for a blank EPROM, can't find one of the right type, decide to work without a net by using your

eraser to blank the one you pulled out of the unit, pull the label off to expose the quartz window, do email for 20 minutes while the UV light literally melts the fuses on the die under the window back together, check to see it's really blanked, then spin your prayer wheel while your programmer burns in the new firmware and hope it verifies.

Hopefully Young can just send you an updated EPROM - plug it in and you're good to go.

Tom