

Tuningguide IMX-40

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When the first IMX 40 hit the water in spring 2001 we had to go through a steep learning curve how to sail this wonderful boat. Due to the runner less carbon rig set up, the quick magic wheel backstay, and the rather narrower relative beam than Niels Jeppesen previous designs, this boat needs his own approach in how to set up the rig and trim the sails. Like every tuning guide the numbers shown and tips given are only a guideline in how to sail this boat. As with many things in life there is more than one road leading to success.

1 General preparation

Upon receiving the boat make sure to check all the items and blocks given with the IMX 40 and install them as per ownershandbook. Please make sure that the appropriate blocks are fitted to the right task as they might look the same but sometimes vary in breaking load. Make sure to tighten all D-shackles hard and if in doubt secure them with tay-rips or similar devices. Make proper markings for easy repeated settings of halyard, genoa car, backstay and traveler. Check whether the spectra strops connecting the double genoa cars on each track are equal in length and mark the track at least at each bolt hole. Check whether the steering cables are taught and the carbon wheel has been tightly mounted. Rig up a webbing from the pulpit up to the second stanchion and tape off all the fastenings before sailing.

2 IMX-40 IMS 2001 Measurement

IMS Measurements are described in the book International Measurement System (IMS), published by the Offshore Racing Council www.orc.org Books & Services. Sailing IMS you should buy International Measurement System (IMS), IMS Regulations and Special Regulations. The authorized measurer who measures your yacht, basically just has to measure what he sees - but of course you have to tell him that you have tried to prepare the measurement to achieve certain freeboard measurements, enabling you to have a fair chance whilst racing. Therefore, before his arrival, you and your crew have to prepare the flotation measurement!!! Remember that before launching your yacht, the authorized measurer has to measure the MWT (mast weight) and the MCG (mast centre of gravity) see IMS chapter 725 and other mast measurements, and all measurements concerning propeller installation IMS Part 6. The following are mast and propeller installation data from yachts already measured: TL=0,870, MDT1=0,115, MDL1=0,243, MDT2=0,099, MDL2=0,182, MW=0,243, GO=0,256, MWT / MCG for masts with different equipment: 184,3/5,059, 187,0/5,04 PRD=0,43, ST1=0,048, ST2=0,169, ST3=0,171, ST4=0,098, ST5=0,274, EDL=1,60

International Measurement System (IMS) Chapter 402. Measurement Afloat describes the following:

Inclined stability and freeboards shall be measured on one occasion with the yacht afloat in measurement trim (see 2 below). Normally, the yacht's spinnaker pole(s) will be required for suspending the inclining weights (see Part 7) and a dinghy or raft must be available for use by the Measurer. The owner or the owner's Authorised Representative (see Measurement Inventory Form. Appx 2) must be present for flotation measurement.

1. Specific Gravity (SG):

The specific gravity of the water shall be measured at this time and recorded as SG. The water

shall be sampled from a level 0.3m (one foot) below the surface.

2. Measurement Trim:

The owner or his representative will put the yacht in measurement trim by following the procedure defined below. The Measurement Inventory set out in Appendix 2 shall be used to ensure and record compliance with the requirements. No substitutions are permitted during measurement afloat.

a) The yacht shall be completed and equipped for sailing.

1. All standing rigging and related fittings used whilst racing will be attached in their normal positions. Running rigging forward of the mast and all halyards and lifts shall be taken to the foot of the mast and hauled tight. All other pieces of running rigging abaft the mast shall be taken to their aftmost position and hauled tight. All halyard tails shall be taken to their normal working positions. If the halyard weight varies significantly along its length, the tail shall be on the cabin floor for the inclining experiment, with the halyard fully hoisted, attached to a light messenger. A halyard may be used as a topping lift.

2. One set of sheets and guys and any running rigging not carried permanently on spars and other portable deck gear used in sailing the yacht shall be stowed abaft the mast on the cabin sole.

b) Booms shall be secured at the low points of P and PY, as the case may be. Any spinnaker pole(s) on deck shall be in their normal stowage. Masts shall be raked aft to the limit of their adjustment. Where this limit is forward of the vertical the mast shall be set vertical.

c) From 1 January 1986 no sails shall be aboard. Yachts measured prior to 1986 may have been measured with sails aboard as detailed in the International Offshore Rule (IOR), Appendix 7. **d)** All mattresses, cushions, and pillows must be aboard during measurement and shall be stowed in their normal bunks. Safely, navigational and cooking equipment shall be aboard and all portable gear normally stowed aft of the foremost mast shall be in its normal position for racing. All portable gear normally stowed forward shall be placed abaft the foremost mast on the cabin sole for measurement, unless otherwise specified in this Rule.

e) No clothing, bedding, food, stores, dinghy, man-overboard pole or liferafts shall be on board.

f) Additional equipment on board during measurement shall be itemised in the Measurement Inventory.

g) The yacht's head shall not be depressed through lying to a mooring.

h) Ballast shall be fixed below the cabin sole, or as low as possible at any station and sealed to the hull structure to prevent movement. The yacht shall not be ballasted in such a manner as to induce list. Anchors and chain shall be secured in clearly marked stowage. Yachts shall be measured with at least one anchor. (Where a yacht has thereafter to carry any extra anchors to comply with sailing instructions those anchors shall be properly secured forward of the foremost mast whilst racing). The batteries shall be secured in their proper stowage. The foregoing items shall be in, and not moved from, these stowages whilst racing except that the anchor and chain may be moved for the purpose of anchoring. The weights of these items and their distances from the stem will be recorded on the Measurement Inventory. (Where the height of the stowage is unusual it shall be noted.) Anchor rope shall not be forward of the foremost mast.

i) All tanks shall be empty at the time of measurement, except where the Measurer has authorized otherwise as follows. In the case of a yacht meeting the requirements of IMS Regulations Part 4 - Cruiser/Racer Division, where a fuel tank lies wholly aft of the main mast and not higher than the minimum required hard bottom height for a settee (see IMS Regulations 409.2), then to avoid having to pump the fuel to empty the tank, the tank may instead be filled and pressed up for measurement. In this case, the capacity of the tank and the type of fuel shall be recorded for the purpose of making an adjustment to the freeboard heights found under 402.3 below. Any such adjustment shall be made in increments of equal value to both FFM and FAM, reflecting the "sink" effect on Measurement Trim resulting from the weight of the fuel aboard. The calculation shall be performed only by the Rating Office based on the weight required to sink the yacht 1mm (displayed as SINK on the Certificate). No adjustment shall be made in trim or measured Righting Moment. The fact that a tank was full, the fuel type, capacity and freeboard increment shall be recorded in the COMMENTS section of the Certificate.

j) Hydraulic systems including hydraulic tanks shall be full for measurement and shall remain full when racing.

- k)** Bilges and other areas where water may collect shall be dry. There must be no effort to artificially moisten decks, rig, equipment or gear.
- l)** No one shall be on board while flotation measurements are being taken.
- m)** Centerboard(s) and drop keels shall be fully raised. If any drop keel or movable appendage is to be locked when racing it shall be so locked for measurement and the locking device shall be in place.
- n)** Painted measurement bands on masts and booms shall be in place.
- o)** If an outboard motor, where it is the yacht's engine, is to be carried when racing it SHALL BE provided with a proper locker and/or mounting bracket. It shall be in this stowage at the time of measurement and at all times when racing. This stowage shall not be such that the center of gravity of the motor is forward of the foremost mast on any yacht inclined or re-inclined after 1 JAN 1983. The condition of separate tankage shall be controlled by sub-para (i) above.

3. Freeboard Measurement:

The vertical height above the waterplane of the port and starboard, fore and aft freeboards shall be separately measured to the Freeboard Points (see 506.2) recorded and permanently marked at the time of hull measurement ashore.

- a)** Freeboard Forward Measured (FFM) shall be recorded as the average of the respective port and starboard freeboards forward.
- b)** Freeboard Aft Measured (FAM) shall be recorded as the average of the respective port and starboard freeboards aft.

According to the IMS chapter 402 it is legal to be measured with fuel in the tanks. This will be a bad idea because your yacht will have deducted the fuel weight on the displacement, but get the higher stability as measured with no credit.

On the IMS Rating Certificate page 2 Measurement Inventory there is space for description of ex weight and positions of tools, spare parts, safety equipment and so on. The amount of safety equipment can be seen on www.orc.org special regulations. Here you can extract the files for monohulls in the category for the actual races the boat has to participate in. It is important that you have all the legal equipment you are going to sail with in the yacht before the measurement afloat.

The offset file to be used for the rating certificate and measurement afloat is the IMX40.off. Please check this with your authorized measurer.

This offset file includes the following positions:

Position for Freeboard Forward measured, FFM is SFFP=0,405 m from the Stem.

Position for Freeboard Aft measured, FAM is SAFFP=11,420 m from Stem is where the transom cuts the deck/hull sheer line.

SFFP and SAFFP shall be the horizontal distance from the forward end of LOA to these stations.

The sheer point for FFM and FAM has to be measured to the point at 45° to horizontal at the hull sheer line.

Preparing the boat with internal ballast before the Measurement Afloat:

At different SG the FFM and FAM should be:

SG	FAM	FFM
1,029	1,126	1,369
1,020	1,124	1,366
1,010	1,121	1,362
1,000	1,119	1,358

To reach this flotation a guide for filling in the lead under the floorboards will be first to fill up the room just in front of the ladder, then the rooms beside the ladder and last the aft part of the rooms at the side of the aft part of the sofa in the main cabin (between the 2 transverse keel steel beams). There is no space for lead under the floorboards beside the pantry and chart table. While filling in the lead you have to check when you are close to the above-mentioned freeboard values.

Remember rule 402 h that ballast shall be "fixed" below ...

If you have a choice it is always best to measure the yacht in water with high SG (high contains of salt). The stability of your yacht will be lower and is used as such in the final IMS calculations. We wish you good luck with the above.

3 How to set up the rig

When rigging the boat make sure to first position the mast foot so that there is a distance of 30-35 mm between the front of the mast and bulkhead at the base of the mast. Then chime the mast in the center of the mast collar (there is not a lot of room around the mast anyway) Be careful not to chime the mast too hard as this might damage the carbon mast. Also be aware that if the mast is equipped with a mast jack, (hydraulic tensioning ram which is highly recommended), to leave enough play in the chimes for the mast to travel up and down on the mast jack.

Turn the forestay turnbuckle until you have the desired length of 16500 mm (pin to pin and turn buckle should read mark 8.5 then) or 16370 mm measured by the centerline halyard with a shackle / splice length of 120 mm. Now tension the V1's, with all the D's completely slack until the mast jack reads a pressure of about 280 bars with both mast jack chimes in. The best way to read the pressure on the mast jack is to read the pressure when you just release it on the chimes. Make sure the mast is in the center and if in doubt measure it out by putting a heavy weight on the centerline halyard and mark it off on each freeboard until the measurement is equal.

Now tension the D1's until they have approximately 45% of the tension of the V1's (you have to do this by feeling) Line the mast out and then proceed with the D2's (30% of V1) and D3's (15% of V1) in the same manner. Keep lining out the rig. After tensioning all the Diagonals the mast jack pressure should read about 380 to max 400 bars. Adjust the backstay main strop so it will allow the top base block (the one attached to the Rod backstay) a minimum travel of 240 mm, make markings referenced to the upper back railing wire and use the 240 mm as your max backstay from slack. If you have a load cell, under sail, it should reach a maximum forestay tension of about 8700 pounds. Now go out sailing and keep a look at the rig and make small adjustments to lign up the rig straight under sail.

Keep checking the mast jack pressure when you're back in the dock to see that you have not gone beyond the max 400 bars of pressure. By putting more relative tension on the D's you can influence the bendiness of the rig as they are slightly swept back they, next to supporting the mast sideways, also pull the mast back. That means by putting more tension on them you will straighten the rig and would facilitate a less luffcurved mainsail. Although the settings as described should fit the standard 3DL North wardrobe.

4 How to run the sheets

When rigging the boat up for a sail take look at the owners handbook drawing of the original sheet layout. It is sometimes easier to run the spinnaker sheets inside the guardrail including the spinnaker barbers. This might look totally wrong for the first time but if you go out sailing you will notice that they only rub slightly against the inside of the stanchions, even under a reach. You have the advantage that during a spinnaker drop the sheets will be neatly kept inboard by the stanchions and avoid dragging in the water.

The guy's, as usual for this size of boat, run inboard of all stanchions. The Cunningham, Outhaul, and Vang are all doubled up for control from the weather side. We found them the easiest in the following order; Vang on the foremost swivel for easy access on the reach by mast or bowman. Cunningham on the middle swivel so it is in reach of either the "piano man" or the windward crew.

We kept the Outhaul on the aft swivel so in light & downwind conditions it is in easy reach of the cockpit crew. Keep a regular check on the mainsheet attachment strop as some of them have been prone to chafing at the boom. Also make sure you check the genoa primary winch locking paws at the bottom gearing as some of them sometimes break in two under hard tear and wear. It is advisable to splice the mainsheet together so the mainsheet becomes endless and allows a

free range of travel at all times from the windward winch. Keep an eye on the Cunningham blocks and see whether they run free at the back of the jumbo instrument bracket.

5 Trim in 2 - 8 knots true wind

In this breeze the boat is extremely hard to feel on the helm and all trim should facilitate power and pressure on the helm. When you are sure the wind is going to be light for the race ease up the O&S forestay turnbuckle to mark 5. This will ease up all the V's and D's a little as the rig has slightly swept back spreaders and will give a bit more pressure on the helm as the mast rakes backwards. It will also increase head stay sack to power up the genoa and induce some more bend to keep the main from becoming to full.

Main:

Sheet hard until top batten is parallel to boom then ease a touch. Keep traveler way above the centerline and promote twist shortly after tack to accelerate. Cunningham and backstay should be loose. Maybe ease some outhaul off in the very light.

Genoa light:

Bring genoa car forward until bottom of genoa is about 30 cm from the rigging while top of sail is touching top spreader. Then ease out a little until top is about 5 - 10 cm away. Play a lot with sheet tension. And make sure to ease out in lifting puffs. Remember in light conditions speed is the name of the game. Leave the halyard slack.

Downwind:

Try to winch the rig forward. Ease backstay totally and make sure your trimmer calls for pressure in the kite at all times. When in doubt come up and sail bigger gibing angles.

6 Trim in 8 - 12 knots of true wind

In this breeze the boat establishes a good feel on the helm and pointing is no problem. Bring the forestay back to mark 7 on the forestay turnbuckle. You can now sheet quite hard on the sails, as pointing is the name of the game. Watch out for waves in the lower wind speed range and make sure to change "gear's" quickly. In 8 knots the boat will still feel light while at 12 knots you feel fully "throttled up".

Main:

Sheet hard until top batten parallel and keep traveler in centerline or slightly to weather. Don't use Cunningham yet to keep the back of the main full and powered. Take outhaul to max. Backstay should be played between 5 - 12 cm of travel.

Genoa medium:

Sheet hard until top of sail and bottom hit simultaneously. Make sure to pull the car forward when there is a slight ease in the wind and try to sheet as close to the spreaders as the conditions allow you. Take the halyard up but leave some "wrinkles" visible in the luff.

Downwind:

Trimmer needs to call for pressure consistently. At 8 knots you still sail quite big angles but at 12 you can nearly sail dead downwind. Make sure to work your gybing angles.

7 Trim in 12 - 18 knots of true wind

At this wind range the boat starts to feel "wound up" and over pressured. It's time to start depowering and make sure all those big bellies are hiking out. Take the forestay up to mark 8.5 on the forestay turnbuckle. It's time to start to loose power and to twist of the sails. Keep an eye on the weather helm as too much pressure slows the boat down. On the earlier Niels Jeppesen designs you could really start to "feather" the boat upwind. (Sailing it very flat and high to the wind). The IMX 40 however is relatively narrower on the beam than the previous designs which means the boat can also sail fast at greater angle of heel and more "bow down". Make sure to

push the boat down to get the speed and twist the main of quite considerably. Then when the speed is up try to point and maintain the speed.

Main:

Keep main well twisted in upper range and start using Cunningham. Backstay should now travel between 12 - 21 cm. When in doubt of speed pull more backstay and twist main. Keep traveler still close to centerline to keep main flowing against the backwind of the genoa.

Genoa heavy:

Move car well back and keep top of sail at least 15 cm of the top spreader and bottom of sail should touch hard at the bottom rigging. Get halyard up close to max and make sure the draft in the sail stays well forward. In puffs ease the genoa car backwards and play it like the traveler.

Downwind:

You can now run square downwind but don't forget to pull in the leeward barber hard. Pump the spi-sheet on the waves and keep the vang tight downwind.

8 Trim in 18 - 22 knots of true wind

The boat now get's seriously overpowered and you will need to change to the genoa no#3 in this range depending on your crew weight and internal ballast set up. But most of you will go faster with the no#3 up from 18 knots +. Pull the forestay in to mark 10 if you can. (Might be hard)

Main:

Keep main well twisted and pull full Cunningham. As soon as the no#3 is up you reduce some twist by sheeting harder and let the traveler down between halfway to full down the track. Backstay should now be full on at 21 to 24 cm of travel. Work the waves with the traveler and ease the sheet in the puffs.

Genoa 3:

Keep car well forward in the lower range of this sail and in waves, as no #3's are then prone for lacking power and drive. Keep an eye on the waves and sheet hard (top inboard of spreader for about 10 cm) in flat water and ease and sheet forward in the more wavy and lighter conditions.

Downwind:

Pump the sheet hard on the waves and ride them down. The boat doesn't surf easily initial due to her narrower beam but after some "encouragement" reaches very high top speeds. Work hard on main and spi-sheet to pump. Keep pole high to encourage lift and the bow to rise.

9 Trim in 22 knots + of true wind

Your are now definitely on the no#3 and need to work on how to drive and trim over the waves. Keep the boat flat and make sure you depower/twist the sails more in the gusts. Although it is difficult, try to drive the boat without regripping on the wheel and loosing your wheel reference. Sometimes the boat looses all feel of weather helm in waves and it is essential to keep the mainsheet working to correct for this so you can drive with minimum correction on the helm.

Main:

Keep well twisted and keep the traveler close down the bottom of the track. Backstay should be full range at 24 cm. If you pull too much backstay the main will invert due to too much mast bend and luffcurve starvation. Ease some and get the main back in line.

Genoa 3:

Keep top of jib just at end of top spreader and sheet hard so the entry low down is flat. Communicate with you helmsman as sheet and twist are vital for his feel and drive through the waves. Ease sail after bad tack or crash in waves. Watch the top batten of the jib downwind when hoist, so it doesn't flip goose winged at the top when coming around the bottom mark.

Downwind:

Do the same as in previous wind range but much more aggressive. I SAID MORE AGRESSIVE!!!! PUMP THOSE SHEETS !!! And don't forget to hang on and enjoy the ride, as the IMX 40's are fantastic to sail downwind with great control and lots of fun. Ride the boat through the lee of a wave as soon as you're galloping down it. But make sure to level out before the next one and when the boat starts rolling just head up a little.

10 Contributors

<p>René Villefranche is a longstanding member of the inventive Danish North loft. In the X-99 class he won an incredible series of 5 World titles with various skippers like Jochem & Dan. He is now in charge of sales in Denmark and Norway for North and is in charge of developing all the sails for the popular X-Yachts range. He was tactician on the first IMX 40</p>	<p>Dan Pedersen was embraced by X-Yachts as a quality controller after winning three X-99 World titles. He is X-Yachts deliverer of a string of sailing successes in all their product range and was a key man in developing the IMX 40's deck & sailing systems. He is now busy with the development of the IMX 45 as follow up of the highly successful IMX 40.</p>	<p>Jochem Visser also started his career in the X-99 with a double World's victory he moved on to campaign the IMX 38 in '93 with record 70 firsts out of 75 starts in one season. In '95 he celebrated his 30th win of a National Class title in Europe. Know by his colleagues as the "Boatspeeddoctor" He sails professionally and topped his career with a win of the Admirals Cup</p>	<p>Jochem Jachtservice Dutch address: Th. de Bockstraat 17/3, 1058 TW Amsterdam UK address: 2 South Drive, Stanbridge Earls, Romsey, Hampshire, SO51 OHE Phone: +44-1794-521672 Fax: +44-1794-830610 Mobile: +31-651-429737 Mobile fax: +31-651491953 E-mail: jvisser@xs4all.nl Website: www.sailned.com/jochem</p>