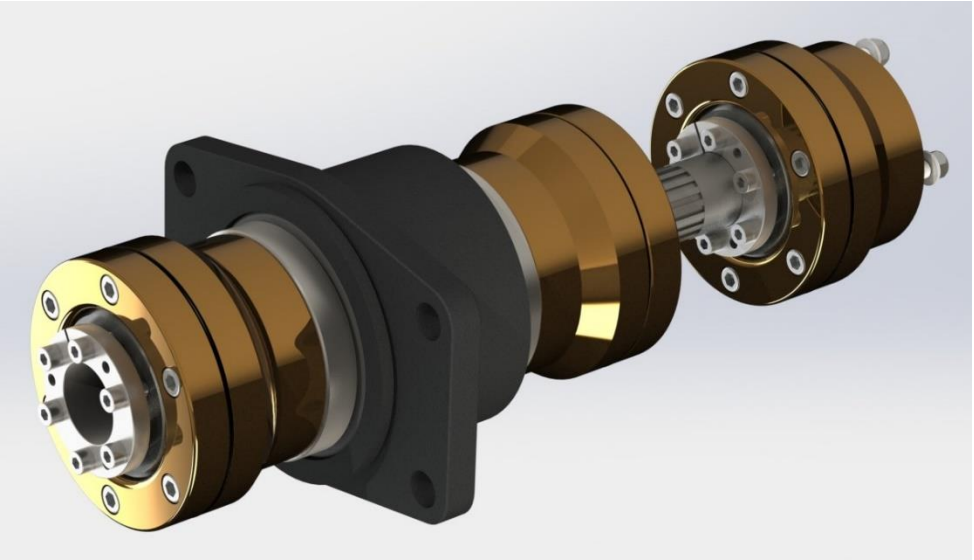
INSTRUCTION MANUAL



STS2250

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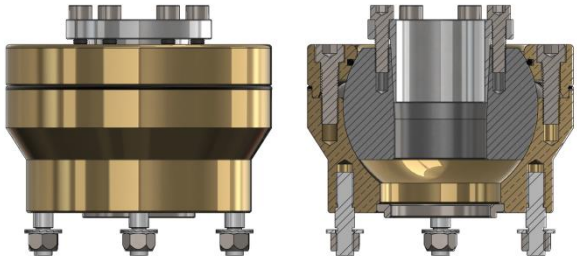
Make sure you have thoroughly read and understood the installation instructions prior to fitting your SigmaDrive.

WHAT SIGMADRIVE IS?

SigmaDrive is a constant velocity joint that is able to resist the propeller thrust without the need for thrust bearings. Fitted in the same place as a standard shaft coupling, it reduces noise and vibration that the engine transmits to the propeller shaft. It corrects misalignment between the engine and propeller shaft up to a working angle of 3 degrees.



INSTALLATION

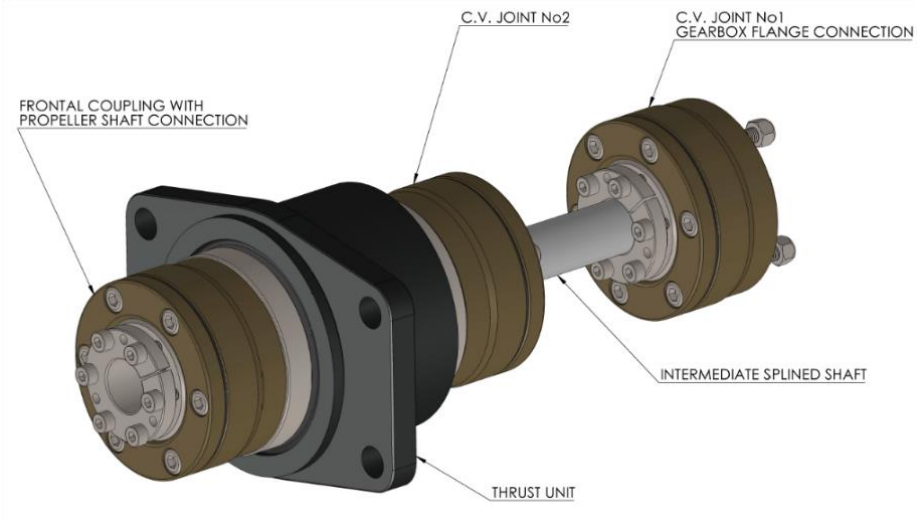


Fig 1. STS assembly

1. The Sigmadrive is supplied ready to fit and will be supplied in three main components.
2. The splined fitting must be positioned closest to the outboard end as per fig 1.
3. The STS2250 can be fitted fully assembled. The splined end should allow enough travel so that the securing bolts to the coupling can be located in place. When the splined shaft is removed from the coupling please note, that at first it might appear to be difficult to refit as the splined teeth need to be perfectly aligned together and the shaft perfectly straight or perpendicular to the spline bore face to allow for engagement.
4. Carefully clean the output flange, which the SigmaDrive unit is being connected to and shaft contact surfaces.
5. Insert the M10 high tensile studs (11) into the corresponding tapped holes to match the gearbox output flange, ensuring the longer threaded side of the stud is threaded into the body of the SigmaDrive. Lock the studs using the two thin M10 lock nuts (14) and the loctite **290** supplied. Remove and disgard lock nuts after fitting.
6. Ensure the output flange register (10) is inserted into the SigmDrive unit prior to fitting to the gearbox flange. This will ensure the SigmaDrive is centered on the gearbox and should be a snug fit. See Fig 3.
7. Remove both clamp units (7) from the central sphere (3) of C.V. joint 1 & 2 (Fig 1). Keep the plain end of the splined shaft inserted in the clamp unit.
8. **Please apply a light oil film on the outer surface of the taper locks (7), making sure that the surface between the taper and central sphere (3) is clean and well lubricated. Use WD-40 or hydraulic oil, this will aid removal. Please do not use oil with molybdenum disulfide, high pressure additives or graphite grease on either the shaft or taper lock. These substances notably reduce the friction coefficient for the clamp unit. Do not apply any lubricant between the shaft and the inside of the taper lock (7) surfaces.**

9. Insert the clamp units into the central sphere and loosly tighten the M8 taper locking bolts (9) using an allen key in a crossed sequence (see fig 4). If alignment blocks are not being used (see fig 1), then go to step 11.
10. Use the alignment blocks to hold the clamp units parallel. Insert the blocks evenly spaced under the clamp unit as per fig 1, and gently tighten the taper locking bolts (9), to sufficiently hold the alignment blocks in place. Do not torque the taper locking bolts (9) until alignment is complete and the alignment blocks have been removed. Proceed with normal alignment and fixing methods with propeller shaft and gearbox, taking care not to exceed the maximum working angle when centering Sigmadrive to gearbox output flange. Please go to step 12.
11. Proceed with normal alignment and fixing methods with propeller shaft and gearbox, taking care not to exceed the maximum working angle when centering Sigmadrive to gearbox output flange. It is preferable to make sure that the shaft is aligned to start with as the maximum installation angle should not exceed 3 degrees. We recommend using our alignment blocks for SigmaDrive to align the shaft, particularly for a new running stern gear. See step 10 for this method.
12. Place the SigmaDrive onto the gearbox flange. Then fit the locking washer (12) and M10 Nyloc nuts (13) to the M10 high tensile studs (11) and tighten firmly to a torque of **61Nm**. Ensure that the output flange register (10) corresponds with the gearbox flange. This is the same as fitting a conventional half coupling as it acts as a register centering ring.
13. Install the thrust unit on to the brackets for the thrust bearings (not included). Ensure to install the 2 CV joints in line as much as possible. **Do not exceed 3° between each coupling, this includes the splined intermediate shaft.** Using the aligment blocks will help keep the shafts within the working angle. Please remember that the engine position can be adjusted to reach the perfect working angle of alignment, after installation is complete.
14. It is very important that the propeller shaft is installed so that is is corrcetly aligned to the thrust bearing. Follow the correct proceedure for standard shaft alignement either using a laser alignment or center line wire method. Should you need futher instructions on the method of alignment please contact Brunton's Propellers and we will provide instructions for this method of alignment.
15. STS2250 is now ready to receive the propeller shaft. Ensure that when inserting the shaft into the STS2250 clamp unit (7) that it slides easily into this component without using too much force. Insert the propeller shaft to the minimum required depth indicated in table 2 (See Fig 2 for diagram and table 2 for dimensions). Maximum shaft insertion depth is 65mm. Position the thrust unit until the prop shaft and the clamp unit are exactly on the same line. Again you can use a laser to check the position, the angle and the alignment of the shaft.
16. **Please apply a light oil film on the outer surface of the taper lock (7), making sure that the surface between the taper and central sphere (3) is clean and well lubricated. Use WD-40 or hydraulic oil, this will aid removal. Please do not use oil with molybdenum disulfide, high pressure additives or graphite grease on either the shaft or taper lock. These substances notably reduce the friction coefficient for the clamp unit. Do not apply any lubricant between the shaft and the inside of the taper lock (7) surfaces.**
17. Once the STS2250 unit is fixed in place the clamp units can then be tightened using the following method. The aligment blocks must now be removed if used.
18. Tighten the M8 taper locking bolts (9) in the sequence indicated in fig 4 at least 3 times by hand using an allen key.
19. Tighten the M8 taper locking bolts (9) in the sequence indicated in fig 4 with a torque wrench to 25Nm, then 30Nm and finally 38Nm. Only tighten to required torque once. Do not exceed 38Nm of torque, this could make it difficult to remove if it is overtightened.
20. Check and make sure all M8 taper locking bolts are tight using an allen key.
21. Note that the shaft will be drawn up into the clamp by as much as 3mm to 4 mm.

Adapter pieces are available for larger gearbox flanges.

WARNING

Before starting the engine, rotate the shaft manually by hand and check that it rotates easily in both directions. Check and if necessary reduce working angle. It is preferable to make sure that the shaft is aligned to start with as the maximum installation angle on each SD225 CV unit should not exceed 3 degrees (Fig 2). The smaller the angle the longer the lifespan of the SigmaDrive will be. The angle can be measured using a bevel gauge and should not exceed our recommendation. After initial sea trials the engine can be adjusted to reach the perfect working angle of alignment, this will be necessary especially if there is any irregular movement on the coupling, when in operation. If alignment was completed with the vessel out of the water, the alignment must be re-checked again when the vessel has been lauched.

The SigmaDrive unit is packed with special high temperature grease. During initial operation it is very likely for the component to expel grease. The operating temperature, in some cases, can make the coupling run a little hot making the grease more fluid. We recommend cleaning the excess grease from the coupling, from time to time, using a cloth. Ensure the vessel is stationary and the engine is switched off, preferably at the dock, when following this procedure. Please also check the temperature of the couplings as they may still be near to running temperature after initial motoring trials, this can be as much as 90 degrees.

Run installation to bring engine up to working temperature and re-check torque settings on the gearbox flange nuts (13) and also the shaft taper locking bolts (9) by hand with an allen key.

MAINTENANCE

The Sigmadrive is extemely low maintainance and does not require regreasing when working at specified angles. Once installed correctly it will last as long as a conventional half couple. Periodically check mounting bolts and nuts for tightness and overall condition.

REMOVAL AND DISASSEMBLY

Loosen the M8 high tensile clamping screws (9) using an allen key. Insert the screws into the dismantling threads on the clamp unit (7) and tighten very gradually and regularly in crossed sequence until the back cone is released. We recommend no more than an 1/8 of a turn on each bolt. If the taper lock component is to be reused, ensure there is no damage to any surface. The M8 cap head screws (9) must be replaced.

TECHNICAL DATA

MODEL	STS2250	**THRUST MAX.**	2800 KG
SERIAL NUMBER		**TEMP. MAX.**	60°C
MAXIMUM TORQUE	2250Nm	**LUBRICATION**	GREASE
MISALIGMENT MAX.	3° EACH COUPLING	**GREASE TYPE**	SKF LGWA 2/0.4
RPM MAX.	3000 RPM		

Table 1. SigmaDrive technical data

SD225			
Shaft Diameter	B	Shaft Diameter	B
45mm	50mm	1.75"	50mm
50mm	55mm	2"	50mm

Table 2. Shaft insertion depth

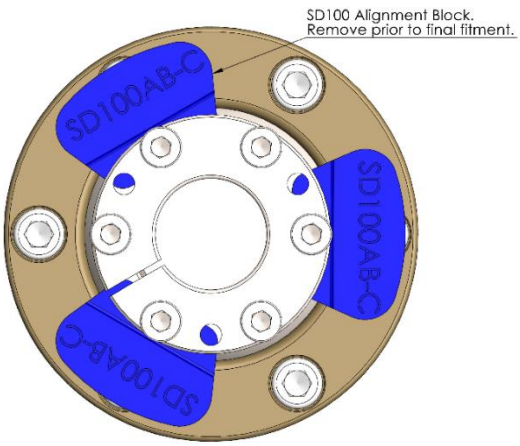


Fig 2. Alignment block

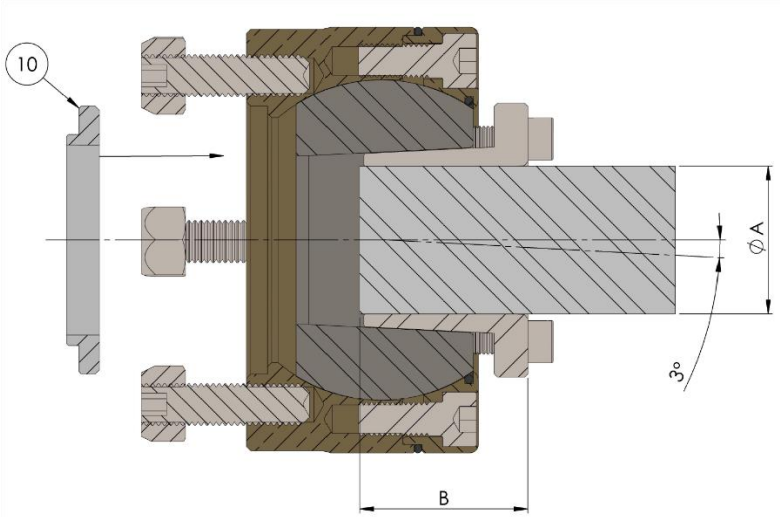


Fig 3. SigmaDrive angle drawing.
Generic drawing for illustrative purposes only.

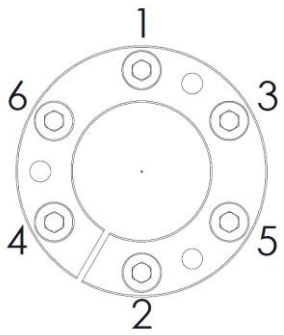


Fig 4. Tightening Sequence

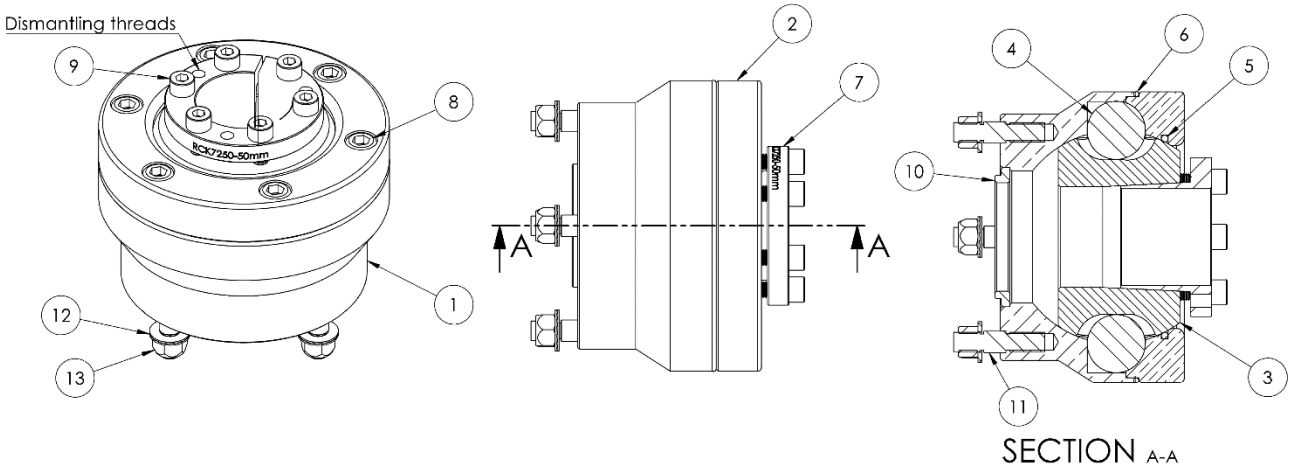


Fig 5. Parts Diagram

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	SD22501	SD225 MAIN CORP	1
2	SD22502	SD225 COVER - **NOT TO BE REMOVED**	1
3	SD22503B	SD225 CENTRAL SPHERE	1
4	SDBB30	BALL BEARING 30mm	6
5	M98.02X03.53'O'RINGNITRILE70	INNER O-RING	1
6	M132.00X02.50'O'RINGNITRILE70	OUTER O-RING	1
7	RCK7250	SD225 CLAMP UNIT	1
8	M10X35SKHDCPTS12.9Z	M10 SOCKET HEAD CAP SCREWS - **NOT TO BE REMOVED**	6
9	M8X30SKHDCPTS12.9ZP	M8 SOCKET HEAD CAP SCREWS	6
10	REGISTER	OUTPUT FLANGE REGISTER	1
11	M10X44STUDEN19T	M10 x 44mm STUD	4
12	H-HLB-10	M10 LOCKING WASHER	4
13	M10NYLOCTS10.9ZP	M10 NYLOC NUT, 10.9 GRADE ZINC PLATED	4
14	M10LN	M10 LOCK NUT	2
15	SD100-150AB	SD100-150 ALIGNMENT BLOCK	3

TERMS & CONDITIONS OF WARRANTY AND PRODUCT LIABILTY

DEFINITIONS

These Conditions shall be incorporated in all Contracts entered into by Bruntons Propellers Ltd ("Company") to the exclusion of any other terms and conditions whether or not the same are endorsed upon, delivered with or referred to in any purchase order or other document delivered by the Purchaser to the Company.

REPAIR, SERVICING & OTHER WORKS

In the event of the Company undertaking the repair or servicing or any other work (whether of a similar nature or not) on goods made available for the purpose by a Purchaser: -

Every care will be taken to carry out the work satisfactorily but no guarantee is given to return goods to their original state or as to their performance, nor is any liability accepted in connection with the time taken to carry out the work;
The Purchaser or his agents shall give the Company or its workmen or those of its agents access to any dock and ship or other premises where the goods are situated and to the goods to be worked on at all reasonable times with the use of normal dock or other services including air, water and electricity. If the Company consider it necessary to work outside normal hours the Purchaser will use his best endeavour to facilitate such work and to provide the necessary access and services.

DAMAGE IN TRANSIT

When the price quoted includes delivery the Company will repair or replace free of charge goods damaged in transit provided the carriers and the Company receive written notification of such damage within seven days of delivery. The Company shall not be responsible for any damage sustained after the goods have been unloaded at the agreed point of delivery of where the Purchaser has failed to notify the Company of the damage within the time period specified.

SPECIFICATION AND PERFORMANCE

Unless the Company has been engaged to produce technical drawings only, all specifications, drawings and other data submitted with a tender or quotation are approximate. Descriptions and illustrations contained in catalogues, prices lists and other advertising matter issued by the Company are intended only to present a general idea of the goods and none of these documents shall form part of any contract unless expressly stated.

1. Unless otherwise agreed by the parties, any drawings, specifications and other data issued by the Company for the purpose of any contract or prospective contract remain the property of the Company and shall be treated as confidential by the Purchaser.
2. Performance figures given are based upon experience and are such as the Company expects to obtain on test. The Company accepts no liability if such performance is not attained in use unless it is expressly guaranteed in the contract. Where such guarantee is given it shall be without prejudice to the provisions of Clause 15 thereof.
3. It is the Purchaser's responsibility to satisfy themselves that the specification offered by the Company defines goods which are sufficient and suitable for the Purchaser's purpose. Defects in quality or dimensions in any delivery shall not be grounds for cancellation of the remainder of the order or contract (if any).

INTELLECTUAL PROPERTY RIGHTS

Unless expressly stated to the contrary and embodied in the contract, all intellectual property rights in respect of the goods and services remain vested in the Company.

1. Where goods are not of the Company's design the Purchaser shall indemnify the Company against all damages, penalties, costs, claims and liability in respect of the infringement of any letters patent registered design or other industrial rights resulting from the carrying out of work in accordance with his design particulars specifications work data or instructions, express or implied.

DELIVERY TAKING OVER AND PASSING OF PROPERTY

Without prejudice to any of the Company's other rights under these terms and conditions notwithstanding delivery of any goods and at the Company's sole discretion, title in the goods shall remain with the Company until they have been paid for in full.

1. If such payment is overdue in whole or in part the Company may (without prejudice to any of its other rights) recover or re-sell the goods or any of them and may enter upon your premises for that purpose, a licence for which purpose is hereby granted, if any of the goods are incorporated in other goods before such payment the Property in the goods delivery by the Company shall nevertheless be and remain with the Company until such payment has been made provided that where any goods delivered under this Contract have been sold by the Purchaser either in their original form or after further processing or incorporating in some products then the Purchaser shall be trustee for the Company of the proceeds of sale thereof or of any claim by the Purchaser in respect of such goods.
2. Notwithstanding the above, risk in the goods shall pass to the Purchaser upon delivery (and you should therefore insure).

PACKAGING

Unless otherwise stated packaging will be in accordance with the Company's standard packaging and is not returnable.

1. The Company accepts no liability whatsoever for damage in transit on the grounds of alleged unsuitability of packaging.

GUARANTEE

1. The Company undertakes during a period of twelve months from the date of delivery and provided the goods have been subject to proper use and storage to replace or at its option repair at a location of its choice goods which prove to be defective due to faulty materials or workmanship. The guarantee is given in lieu of any liability or guarantee implied by law in respect of the liability of the Company.
2. Defective items or parts thereof must be promptly returned to a location chosen by the Company. If the defect is found to have arisen under conditions covered by this guarantee, then the Company will repair or replace the defective part and send the repaired or replacement part free of charge. If, however, the goods are found either to be serviceable or to be defective for reasons outside the guarantee then, the entire costs of the test repair or replacement and carriage shall be borne by the Purchaser. The Company decision as to whether or not a defection is covered by this guarantee or not shall be final and binding on both parties.
3. In respect of parts of components with a finite life not manufactured by the Company the Purchaser shall receive only such guarantee as shall be given by the manufacturer or supplier thereof to the Company.
4. The benefits of sub-clause .1 and .2 shall apply to any goods repaired or replaced in accordance with the terms hereof.
5. The Company shall have no responsibility for goods or parts thereof altered by the Purchaser without the Company's express written agreement or exhibiting wear or suffering damage before the expiration of the Company's guarantee period due wholly or partially to improper or careless treatment or operation, excessive stressing, sandy or polluted water, deposit of or intrusion of extraneous bodies, or defective shipbuilding or machinery installation work, or for defects caused by or causing or contributing to vibration characteristics of a ship or engine.
6. In the event of the Company providing a member of its engineering staff to attend at the installation of a SigmaDrive manufactured or repaired by it, it is to be understood that except as otherwise agreed in writing with the Company any advice and/or assistance will be given in good faith but without any acceptance of responsibility.
7. Normal wear and tear will not be covered under warranty.
8. Parts not serviced correctly in the prescribed time frame with OEM parts, tools and grease, will be void of warranty.

TESTS

Goods if manufactured by the Company and requiring tests or inspection shall be tested at a place nominated by the Company. If the Purchaser or his representative does not attend, the Company will have the test or inspection carried out in accordance with the specification and the Purchaser shall be deemed to have accepted such test or inspection. If any additional or special tests by more than one Classification Society or Inspection Authority are required, the extra costs shall be borne by the Purchaser.

LIMITATION ON LIABILITY

The Company does not accept, and the Client indemnifies the Company against, any consequential loss and liability whatsoever, howsoever arising, directly or indirectly, from the provision of work, goods or services under the Contract.

1. The Company shall be liable for general damages to the Customer's arising, directly or indirectly, from the provision of work, goods or services under the Contract. The Company's liability in respect of such damage shall in every respect, unless otherwise agreed in writing by the Company, be limited to 25% of the value of the work, goods or services provided under the terms of the Contract.

HEALTH AND SAFETY INDEMNITY

1. The Purchaser shall indemnify the Company in respect of any liability, monetary penalty or fine in respect of, or in connection with the Products incurred by the Company under the Health and Safety at Work Act 1974 or any statutory modification or re-enactment thereof or any regulations, orders or direction made thereunder.

JURISDICTION

1. All Contracts shall be construed in accordance with English Law and all disputes which may arise under or in connection with the Contract shall be submitted to arbitration in accordance with the Arbitration Act 1950 and any statutory modification or re-enactment thereof.