



## **ECS - HVII TYPE METAL MEMBRANE COUPLING**

### **Installation, Operation and Assembly Instructions**

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ECS-HVII TYPE Installation ATEX

Version 02/05 British Autogard Limited

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- D** Diese Betriebsanleitung ist auch in Deutsch erhältlich. Bitte fordern Sie eine entsprechende Version von Autogard an.  
**I** Questo manuale è anche disponibile in Italiano. Prego richiedere una copia ad Autogard se necessario.  
**PL** Dokument ten można uzyskać również w języku polskim.
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## ATEX CERTIFICATION

The Autoflex ECS range of couplings has been approved for use in potentially explosive atmospheres, in accordance with the ATEX Directive 94/9/EC. The full marking details for couplings approved for this use are:

**BRITISH AUTOGARD LIMITED, CIRENCESTER, UK. GL7 6EU**  
**AUToFLEX ECS HVII**

**CE**  **I M2, II 2GD. Ta = -50°C to 50°C (T6) / 60°C (T5) / 100°C (T4)**  
**SIRA 03ATEX9337**

On being put into service in a potentially hazardous atmosphere, the machinery into which the coupling is installed must be declared in conformity with Directive 94/9/EC. Special note is to be made of the ambient operating conditions, to ensure that surface temperature restrictions are met for the assembled machinery. It is a condition of safe use, that the limiting performance parameters (torque, speed and misalignment) specified in this manual are adhered to.

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## PERFORMANCE PARAMETERS

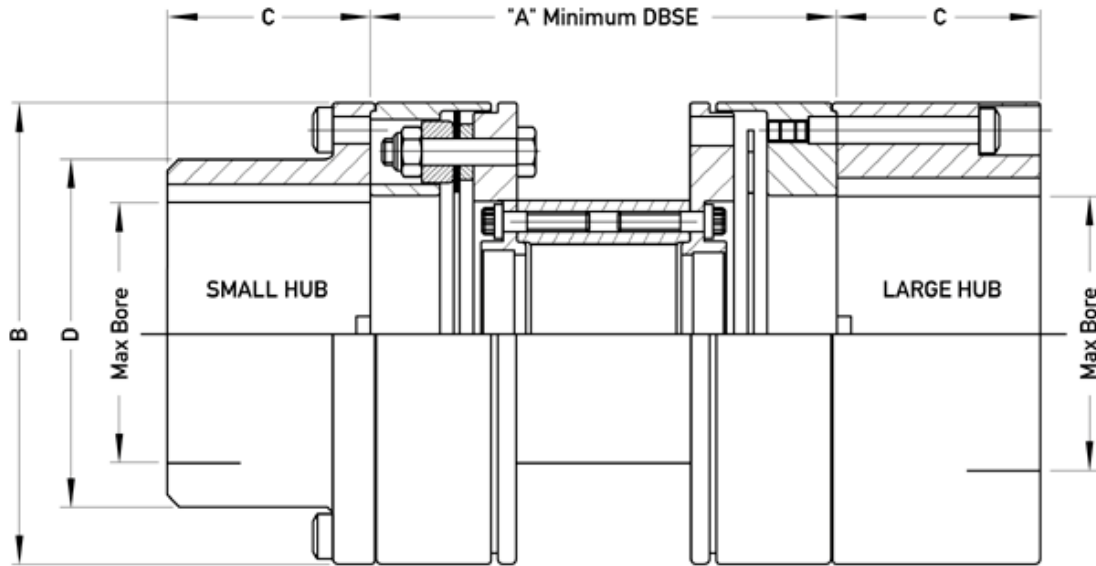
The coupling is designed to be used within the parameters set out in the table below, according to the coupling size designation and actual distance between shaft ends (DBSE) supplied. The torque ratings are nominal and service factors may have been applied, depending on the duty requirements. See “Selection Verification”

Coupling Size	Torque Rating		Maximum Speeds		Min DBSE (mm)	Max Offset R (mm)*
	Continuous (Nm)	Peak (Nm)	Unbalanced (rpm)	Balance d (rpm)		
11 - 4	110	220	8800	19000	65	0.18
19 - 4	190	380	8000	17000	78	0.24
15 - 6	150	270	7600	11000	80	0.34
35 - 6	350	620	6700	9700	100	0.44
70 - 6	700	1240	6000	8600	100	0.44
130 - 6	1300	2600	5500	7800	114	0.48
150 - 6	1500	3000	5200	7500	110	0.48
220 - 6	2200	4400	4900	7000	131	0.56
330 - 6	3300	6600	4500	6500	152	0.65
480 - 6	4800	9600	4100	6100	169	0.72
700 - 6	7000	14000	3800	5600	185	0.79
880 - 6	8800	17600	3600	5200	210	0.89
1300 - 6	13000	26000	3400	5000	223	0.95

\* Quoted values are for min DBSE. For longer DBSE's, allowable offset =  $r + (\text{extra DBSE} \times \tan 0.5^\circ)$

Coupling Size	Torque Rating		Maximum Speeds		Min DBSE (mm)	Max Offset R (mm)+
	Continuous (Nm)	Peak (Nm)	Unbalanced (rpm)	Balance d (rpm)		
340 - 8	3400	6800	8000	12800	120	0.33
510 - 8	5100	10200	7400	11250	139	0.38
740 - 8	7400	14800	6800	10000	157	0.43
1040 - 8	10400	20800	6400	9000	179	0.49
1410 - 8	14100	28200	6000	8200	197	0.53
1900 - 8	19000	38000	5600	7500	216	0.57
2500 - 8	25000	50000	5300	6900	239	0.64
2870 - 8	28700	57400	5100	6400	251	0.66
3590 - 8	35900	71800	4800	6000	279	0.74
4420 - 8	44200	88400	4600	5500	296	0.78
7240 - 8	72400	144800	4100	4700	343	0.90
11660 - 8	116600	233200	3800	4000	405	1.06
20000 - 8	200000	400000	3400	3400	485	1.27

+ Quoted values are for min DBSE. For longer DBSE's, allowable offset =  $r + (\text{extra DBSE} \times \tan 0.3^\circ)$



**ECS HVII COUPLING**

The following instructions apply to standard ECS HVII couplings. The actual coupling supplied may vary depending on the customer's requirements and specifications. Where supplied, these instructions should be read in conjunction with the coupling general arrangement drawing.

**SELECTION VERIFICATION**

The user is responsible for ensuring that the coupling ordered will in fact meet the duty requirements and the duty has not changed from the time that the coupling was originally selected. The selection procedure is as follows:

1. Determine the service Factor (SF) from the table below.
2. Calculate the nominal driving torque,  $T = kW \times 9550/rpm$
3. Calculate the torque rating for the application =  $T * SF$
4. Select the coupling which has the next highest continuous torque rating
5. Check the limiting conditions:
  - ✓ That the bore capacity is suitable
  - ✓ Check the speed capability according to whether or not it is balanced
  - ✓ Check the coupling dimensions: DBSE, overall length and outside diameter
  - ✓ Check that the peak torque capacity will not be exceeded

Autogard can supply the duty under which the coupling was originally selected.

Load Characteristics	Electric Motor Steam Turbine Gas Turbine	Steam engine Water Turbine 8cyl Recip Engine	6 cyl Recip Engine	4 Cyl Recip Engine
Constant Torque	1.0	1.5	2.0	2.5
Slight Fluctuations	1.5	2.0	2.5	3.0
Moderate fluctuations/light shock	2.0	2.5	3.0	3.5
Large Fluctuations/Mod. Shock	2.5	3.0	3.5	4.0
Shock + light torque reversals	3.0	3.5	4.0	*
Heavy shock/large torque reverse	*	*	*	*

\* Consult Autogard Engineering



## **INSTALLATION**

### **Preparation**

The coupling should be unpacked and examined for any signs of damage, which may have occurred during transit. Verify that all the parts have been properly supplied as per the order. Check that the coupling bores and shaft separation are per the original order. Care should be taken to ensure that all spigots and bores are free from burrs.

### **Fit Hubs**

Autoflex ECSHVII hubs typically have a straight parallel bore and keyway for a light interference fit. Refer to the order for specifics related to the actual bore and keyway specified.

For standard interference, the coupling hubs should be heated to 150 degrees C (300 degrees F) in an oil bath or an oven. Do not use spot heat or exceed 300 degrees C (600 degrees F) as this may cause flange distortion. Fit the hubs onto the shafts with the hub face flush with the shaft end or as specified in the General Arrangement Drawing. When clearance fit hubs are supplied, slide the hub onto the shaft and tighten the set-screws.

Where Taper Bores and/or Hydraulic Mounting is supplied, consult Autogard for the appropriate installation instructions.

NOTE: Care must be taken to ensure that the coupling hubs are properly supported during installation to ensure that they do not slip.

### **Shaft Alignment**

To align the shafts place the equipment into its approximate location. Measure and set the DBSE (Distance Between Shaft Ends) of the equipment as per the original specification. This should correspond to the DBSE supplied on the General Arrangement Drawing where supplied.

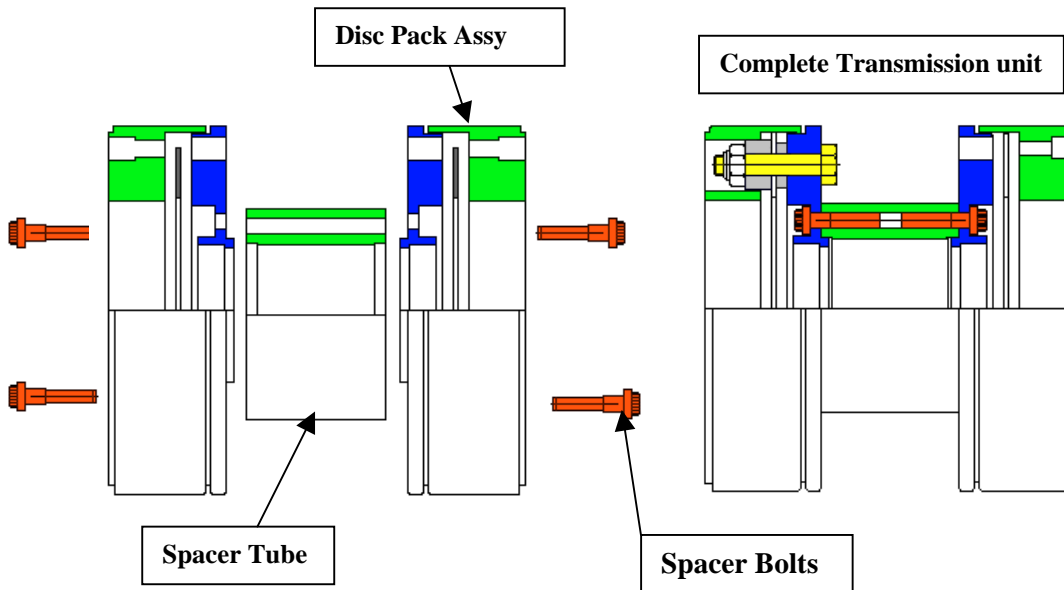
Note: The DBSE is usually measured from the inner face of the hub, which usually relates to the overall length of the transmission unit.

Align the centre line of the driving and driven shafts using the best available methods. Autogard recommends the use of Laser Alignment where available. The better the alignment the lower the resultant loads will be transmitted onto the bearings of the driving and driven equipment. Autogard recommends that the misalignment be set at no more than 10% of the catalogue values. This will allow for misalignment, which occurs due to foundation settling, thermal growth etc. The coupling alignment should be checked periodically to ensure that alignment deterioration is properly compensated.

## ASSEMBLY

### Bolted Spacer Transmission Unit

Check the spigot on the Disc Pack Assembly and the Spacer Tube to ensure that they are free from dirt and burrs. Using the Spacer Bolts provided, assemble the Disc Pack Assembly to the Spacer Tube. Tighten the Spacer Bolts to the torque shown in Table 1. Dynamically Balanced Transmission Units are factory pre-assembled. **DO NOT DISASSEMBLE.**



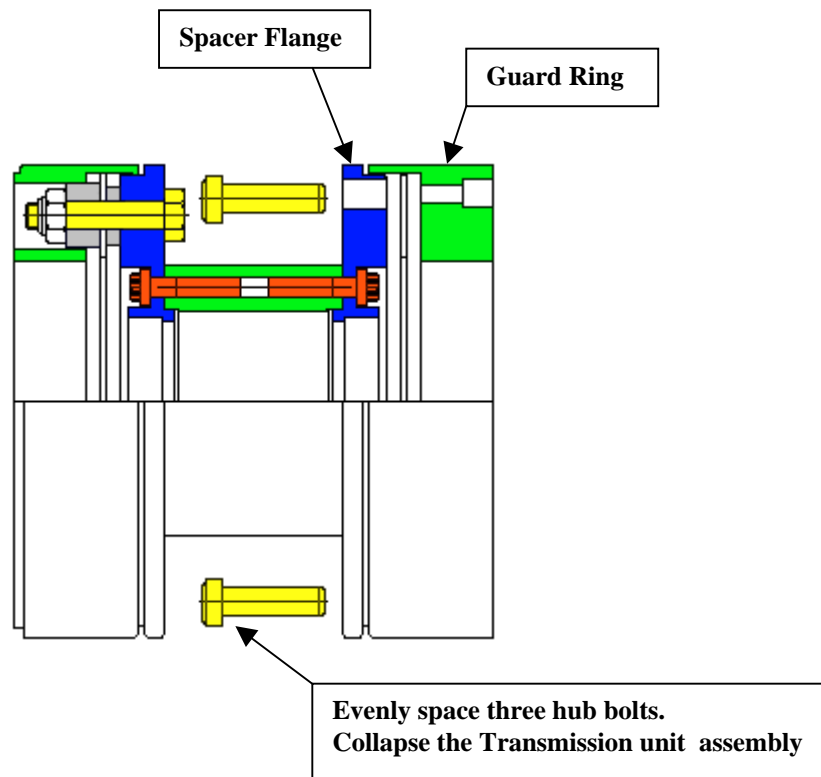
**Table 1 - Spacer Bolt Tightening Torque**

Coupling Size	Spacer Bolts No.off x Size (mm)	Bolt Tightening Torque (Dry) (ft-lbs)	Bolt Tightening Torque (Dry) (Nm)
11 - 4	NA*	NA*	NA*
19 - 4	NA*	NA*	NA*
15 - 6	12 x M6	11	14
35 - 6	16 x M6	11	14
70 - 6	24 x M6	11	14
130 - 6	20 x M8	26	35
150 - 6	20 x M8	26	35
220 - 6	20 x M10	51	69
330 - 6	24 x M10	51	69
480 - 6	24 x M12	89	120
700 - 6	32 x M12	89	120
880 - 6	24 x M16	220	299
1300 - 6	24 x M16	220	299
8 - Link Range	NA*	NA*	NA*

\* Spacers have integral flanges. Transmission unit supplied ready assembled.

## Installation Between Hubs

Check the spigot on both the hubs and the transmission unit to ensure that they are free from dirt and burrs. Using three of the standard hub bolts, uniformly collapse the guard ring and the spacer flange as shown and place the transmission unit between the mounted hubs.



Remove the compression bolts ensuring the transmission unit properly engages the hub spigot. Install the bolts through the hub and tighten to the torque shown in Table 2 or as shown in the General Arrangement Drawing. Bolts should be tightened in a diametrically opposite sequence.

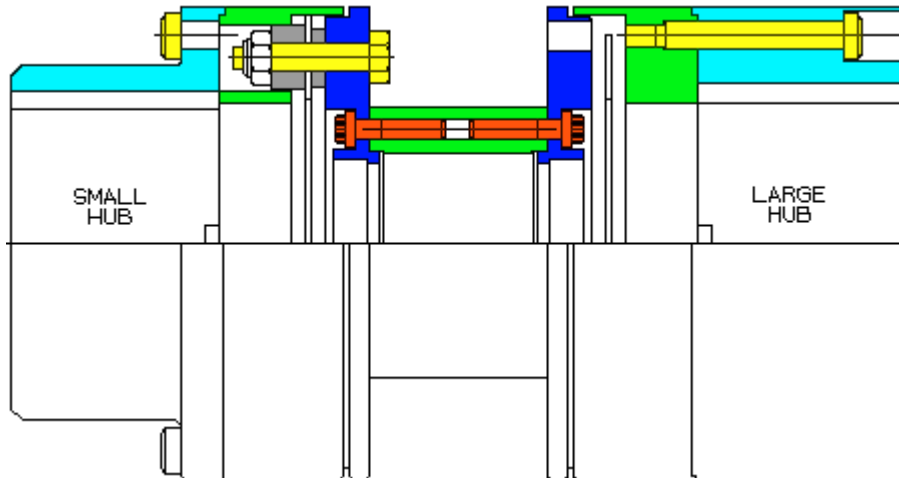
### **Caution:**

Ensure compression bolts are removed prior to tightening any of the hub bolts. Balance coupling hub bolts have been weigh balanced and must only be supplied as a set. Disc packs are factory assembled. DO NOT loosen the disc pack fasteners.

**Table 2****Hub Bolt Tightening Torques**

Coupling Size	Hub Bolts No off x Size (mm)	Bolt Tightening Torque (Dry) (ft-lbs)	Bolt Tightening Torque (Dry) (Nm)
11 – 4	8 x M6	11	14
19 – 4	8 x M6	11	14
15 – 6	12 x M6	11	14
35 – 6	12 x M8	26	35
70 – 6	12 x M8	26	35
130 – 6	12 x M10	51	69
150 – 6	12 x M10	51	69
220 – 6	12 x M12	89	120
330 – 6	12 x M10	51	69
480 – 6	12 x M12	89	120
700 – 6	12 x M12	89	120
880 – 6	12 x M16	220	299
1300 – 6	12 x M16	220	299
340 – 8	16 x M8	26	35
510 – 8	16 x M10	51	69
740 – 8	16 x M10	51	69
1040 – 8	16 x M12	89	120
1410 – 8	16 x M12	89	120
1900 – 8	16 x M16	220	299
2500 – 8	16 x M16	220	299
2870 – 8	16 x M16	220	299
3590 – 8	16 x M20	430	584
4420 – 8	16 x M20	430	584
7240 – 8	16 x M24	743	1010
11660 - 8	16 x M24	743	1010
20000 - 8	16 x M30	1479	2010

The standard for balancing the ECS HVII is to component balance and as such match marks are not used. If match marks are present, the coupling has been specially balanced. The coupling must be assembled with the match marks in-line.



**COMPLETE ECS HVII COUPLING ASSEMBLY.**

Once the coupling has been installed as noted above, slowly rotate the machinery to ensure that everything moves freely.

**IMPORTANT INSTRUCTIONS BEFORE START-UP:**

- Coupling guards must be provided in accordance with local and national regulations.
- Make sure all fasteners have been properly installed and tightened per the supplied tables or the General Arrangement Draws.
- If possible, re-check the coupling alignment after the driver and driven foundation bolts have been tightened.
- Consult Autogard Engineering for clarification of any of the points outlined in this installation guide.
- Only authorised Autogard replacement parts are to be used.

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