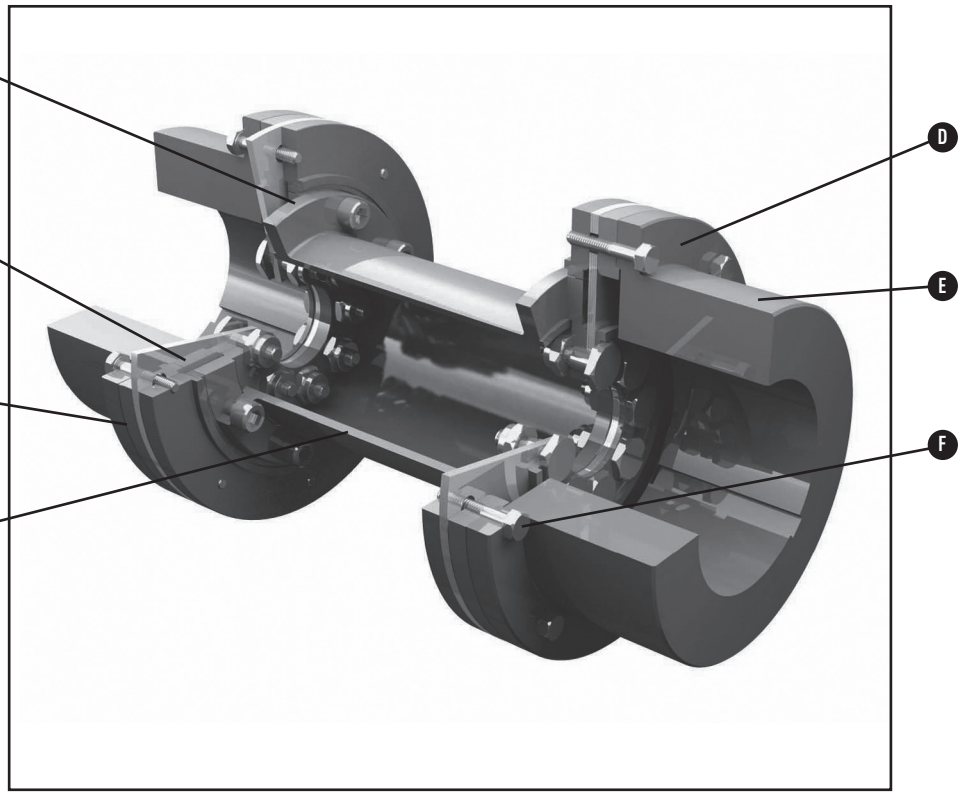
TYPE MHSO/MHSS

M SERIES DIAPHRAGM COUPLINGS

METASTREAM®

Technical Specification

A – Stainless Steel Flexible Membranes
B – Cartridge Membrane Unit
C – Anti-Fly Bearing
D – Anti-Corrosion Treatment
E – Hubs with Standard Puller Holes
F – Robust Hub Bolts
G – Removable Spacer



Product Description

John Crane's M Series couplings incorporate a unique radial spoke, stainless steel, flexible membrane design. This design provides the most reliable and safe solution available, and has the added advantage of allowing the equipment to disconnect if severe torsional overload occurs.

- Easy to fit cartridge membrane units
- Meets ISO 13709 (API 610)
- Meets ISO 14691
- Can be supplied to meet ISO 10441 (API 671)
- Intrinsic balance meets AGMA class 9
- Ideally suited for electric motors and turbine drives in critical process industries, marine, and power generation applications

Design Features

- Excellent power-to-weight ratio
- High misalignment capacity
- Low imposed forces on machinery leading to: reduced machinery vibration and longer bearing life
- Stainless steel flexible membranes for longer life
- Replaceable cartridge membrane design can be fitted to any length spacer to maximize the use of inventory held
- Anti-fly retention of the spacer in the unlikely event of membrane failure
- Standard API puller holes incorporated into hubs

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MHSO and MHSS Technical Data (Metric)

Coupling Designation MHSO MHSS	Nominal Rating kw/ 1000rpm	Max Speed RPM		Mass (kg)				Moment of Inertia (kg.m²)				Torsional Stiffness (MNm/ rad²)		
				Transmission Unit			Hub	Transmission Unit			Hub	Q	QS	QE
		Balanced	Unbalanced	MHSO + Adaptor	MHSS min DBSE	MHSS extra per M DBSE	Unbored	MHSO + Adaptor	MHSS min DBSE	MHSS extra per M DBSE	Unbored	MHSO + Adaptor	MHSS min DBSE	MHSS extra per M DBSE
0003	3	24000	5000	0.6	1	1.4	0.43	0.0004	0.0006	0.0002	0.0002	0.05	0.02	0.0018
0006	6	20000	5000	1	1.6	1.95	1.01	0.0013	0.002	0.0005	0.0007	0.17	0.05	0.0049
0015	15	16000	5000	1.7	2.6	3	1.99	0.0034	0.0051	0.0019	0.0024	0.3	0.12	0.019
0030	30	14000	4500	3.1	5.1	3.9	3.41	0.01	0.015	0.0028	0.0065	0.29	0.12	0.028
0060	60	12000	4200	4.4	7	5	6.52	0.018	0.026	0.0056	0.017	0.64	0.26	0.056
0075	75	11500	4000	5.3	8.5	6.2	7.3	0.023	0.035	0.0079	0.02	0.73	0.28	0.083
0100	100	11000	3900	5.7	8.8	6.8	9.3	0.029	0.043	0.011	0.029	0.68	0.3	0.105
0200	200	10000	3600	8.6	14	11.3	16	0.06	0.092	0.029	0.067	1.4	0.63	0.293
0450	450	8800	3200	13	22	20	25.6	0.131	0.198	0.089	0.153	2.3	1.1	0.898
0600	600	8200	3100	16	26	25	30.4	0.175	0.285	0.127	0.209	3.4	1.6	1.27
0900	900	7800	3000	18	32	35.5	37.7	0.22	0.386	0.224	0.29	5.3	2.5	2.25
1200	1200	7500	2900	25	44	32.5	46.6	0.36	0.597	0.218	0.403	6.4	2.9	2.19
1500	1500	7300	2750	36	60	39	61.7	0.685	1.04	0.299	0.68	6.6	3.1	3
2000	2000	6600	2600	55	84	48	73.9	1.19	1.83	0.452	0.937	11.7	5.3	4.54
3000	3000	6000	2500	68	110	61	104	2.2	2.75	0.65	1.62	8.8	4.2	6.53
4500	4500	4900	2000	105	162	81	169	5.56	6.77	1.49	4.1	14.3	6.8	15
6800	6800	4300	1600	142	217	107	258	9.65	11.6	2.58	8.03	15.8	7.7	25.9
9010	10000	3900	1500	200	319	131	321	16.1	20.4	3.59	11.46	23.1	11.1	36.1

Transmission Unit of non- spacer coupling (MHSO) is membrane unit plus adaptor. Transmission Unit of spacer coupling (MHSS) is coupling without hubs. Weights and Inertias stated are based on minimum DBSE (E) and standard materials. All Dimentions in mm unless otherwise stated. Maximum bores based on standard ISO/BS rectangular keys. Torsional Stiffness values are for minimum DBSE (E). For longer DBSE's the stiffness is calculated by the following equation

$$Q = \frac{Qs\ Qe}{L \times Qs + Qe}$$

Where L = DBSE - E (in meters)

MHSO and MHSS Dimensional Data (mm)

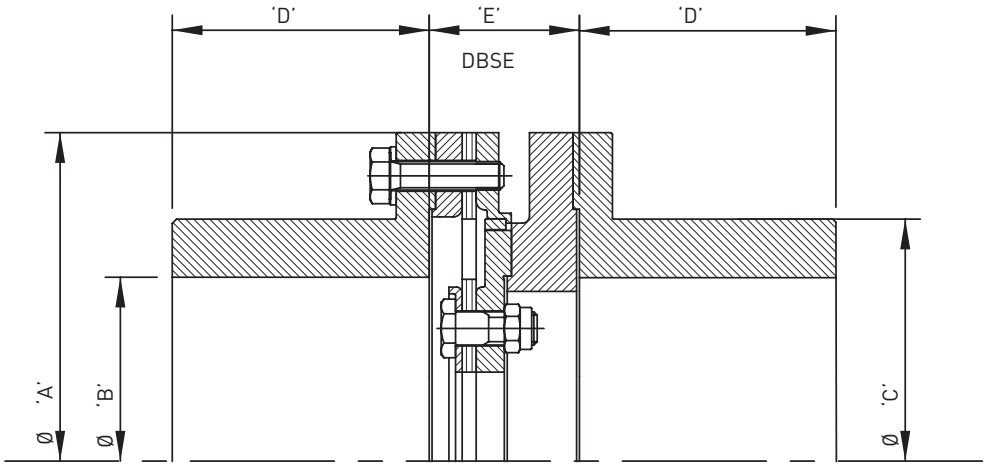
Coupling Designation MHSO MHSS	A	B	C	D	E	
					DBSE	
					MHSO	MHSS
0003	73	25	44	25.0	26.2	70
0006	98	45	63	32.0	26.2	75
0015	123	56	81	39.8	27.0	80
0030	148	75	107	39.8	35.7	110
0060	170	90	130	54.8	37.7	114
0075	180	95	135	59.8	38.1	115
0100	189	100	144	64.8	38.5	121
0200	218	120	172	80.0	47.6	143
0450	262	140	200	91.7	52.4	170
0600	281	150	215	94.7	52.4	170
0900	297	160	228	104.7	54.8	175
1200	316	170	242	115.2	62.7	203
1500	354	180	260	124.9	76.2	229
2000	392	195	280	129.9	92.0	242
3000	431	215	320	144.9	96.8	280
4500	532	250	370	160.0	108.0	292
6800	608	280	420	190.1	111.0	323
9010	659	300	470	200.0	127.0	363

TYPE MHSO/MHSS

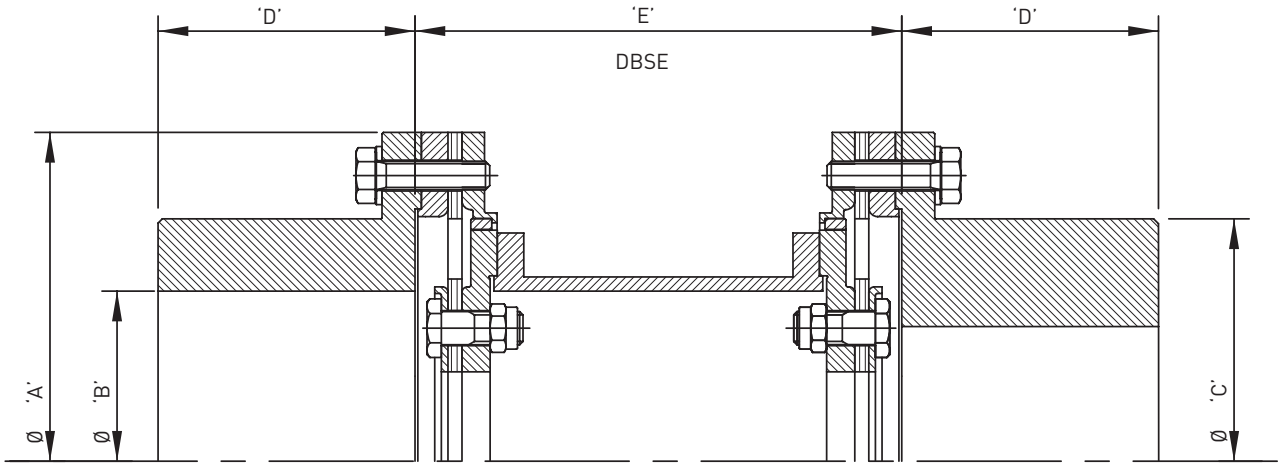
M SERIES DIAPHRAGM COUPLINGS

Technical Specification

MHSO Non Spacer Coupling



MHSS Spacer Coupling



TYPE MHSO/MHSS

M SERIES DIAPHRAGM COUPLINGS

METASTREAM®

Technical Specification

Coupling Alignment

Correct installation and alignment of couplings is essential for reliaible machinery performance.

The angular and axial restoring forces in the table below are given at maximum deflections. The chart can be used to determine forces across the full deflection range. The nonlinear characteristics can detune a system to prevent high amplitude axial vibration.

MHSO / MHSS - Metric Misalignment Capabilities (1)						
Coupling Size	(2) MHSO Max. Axial ± mm	(2) MHSS Max. Axial ± mm	Equivalent Thrust kN	(3) Max. Angular Degrees	Restoring Moment at Max. Angle Nm	(4) Max. Parallel mm
0003	0.4	0.8	0.33	0.5	5	0.46
0006	0.6	1.2	0.45	0.5	7	0.52
0015	0.6	1.2	0.78	0.5	23	0.56
0030	1	2	0.67	0.5	16	0.76
0060	1.1	2.2	1	0.5	26	0.76
0075	1.1	2.2	1.25	0.5	28	0.8
0100	1.1	2.2	1.25	0.5	30	0.85
0200	1.1	2.2	1.65	0.5	37	0.98
0450	1.3	2.6	2.5	0.5	86	1.19
0600	1.3	2.6	3.5	0.5	100	1.19
0900	1.3	2.6	4.7	0.5	220	1.21
1200	1.4	2.8	5	0.5	225	1.41
1500	1.8	3.6	6	0.5	240	1.57
2000	2	4	6.75	0.5	280	1.59
3000	2.4	4.8	7.5	0.5	250	1.91
4500	2.8	5.6	12	0.5	410	1.94
6800	3.3	6.6	12.5	0.5	580	2.24
9010	3.4	6.8	18	0.5	780	2.42

Notes:

1 Misalignment data provided is given for an MHSS spacer coupling. The MHSO non spacer coupling will have half the axial displacement shown and no parallel misalignment capability.

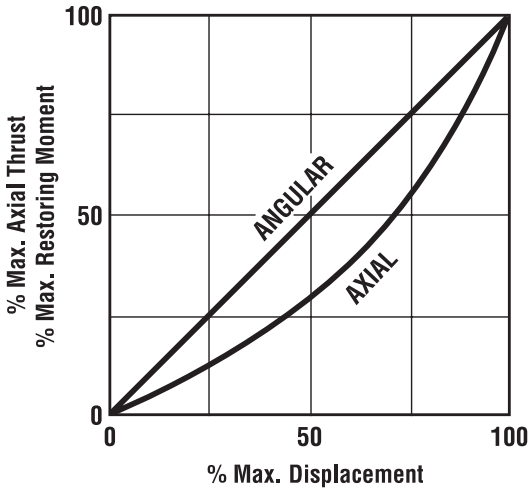
2 Meets National Electrical Manufacturers Association (NEMA) end float specification without modification.

3 Per membrane unit.

4 Values based on Stainless Steel and a angular deflection of 1/2° per end and minimum DBSE. For Monel® multiple by 0.8. Greater misalignment accommodation is possibly increasing dimension E.

These values are maximums for each type of misalignment. It is recommended that the coupling is initially aligned to 10 percent of these values to allow for inevitable movements during the life of the machines.

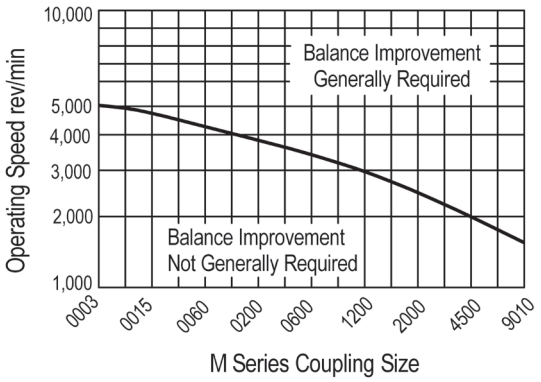
John Crane supplies a variety of shaft alignment equipment and offers alignment training courses. LASE-A-LIGN™ EX Shaft Alignment System is one of the toughest and most robust measurement and alignment systems available. For alignment work in potentially explosive environments, equipment needs to be explosion-protected. LASE-A-LIGN™ EX Shaft Alignment System complies with the latest ATEX standards for work in such environments.



Balance Condition

The inherent balance of the M Series range meets AGMA standard 9000-C90 class 9. The adjacent chart relates the M series sizes to operating speeds on the basis of this AGMA class 9 characteristic to provide a general guide to determine if dynamic balance improvement is necessary.

When balancing improvement is requested, John Crane will dynamically balance the transmission unit. Hubs may also be dynamically balance, and this will usually be carried out after machining the bore but before cutting single keyways.



TYPE MHS0/MHSS

M SERIES DIAPHRAGM COUPLINGS

METASTREAM®

Technical Specification

Selection Procedure

1. Select appropriate service factor (SF).
2. Calculate coupling rating R from

$$R = \frac{kW \times 1000 \times SF}{N}$$

Where:

kW = driver rater power
N = speed (rpm)

3. Select a coupling with the same or higher rating.
4. Check the hub bore capacity is suitable.
5. Check peak torque capability is suitable for application.
6. Check speed capability.
7. Check whether additional dynamic balancing is required.
8. Specify Distance Between Shaft Ends (DBSE).

Example:

600 kW electric motor to centrifugal pump at 1500 rpm

SF = 1.0

$$R = \frac{600 \times 1000 \times 1.0}{1500}$$

R= 400 kW per 100 rpm

Selection: MHSS - 0450

Hub bore up to 140mm

Peak torque capability – 11 kNm

Max. speed capability – 8,800 rpm

Additional dynamic balancing should not be required

Minimum DBSE 170mm

Service Factor (SF)

Suggested service factors for electric motor, steam turbine, and gas turbine drivers are given below.

Torque Variation	Typical Application	Service Factor
Constant Torque	Centrifugal Pump Centrifugal Compressor Axial Compressor Centrifugal Blower	1.0*#
Slight Torque Fluctuation	Screw Compressor Gear, Lobe and Vane Pumps Forced Draft Fan Medium Duty Mixer Lobe Blower	1.5
Substantial Torque Fluctuations	Reciprocating Pumps Heavy Duty Mixers Induced Draft Fans	2.0

*Use a minimum service factor of 1.25 on electric motor drives through a gearbox.

#With Monel® Membranes use's a minimum service factor of 1.3 or ensure that any angular misalignment is reduced to below 0.4° per membrane bank.

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The examples given are for typical machines and are empirically based guidelines. Knowledge of actual torque characteristics may indicate a different service factor. Consult John Crane for advice.

KSelect is an internet based selection program for the MHS
This selection program provides all necessary technical data including inertias and torsional stiffness.

Visit www.johncrane.com

Available Options

- Spark-resistant couplings for hazardous zone operation
- Special materials for low temperature applications, and/or higher corrosion resistance
- Overload protection
- Limited end float and axially adjustable designs
- Torsional tuning
- Electrical insulation can be incorporated without changing the couplings characteristics
- The ZMH coupling can be fitted with a composite spacer, which with the cartridge design membrane unit, makes it ideal for cooling tower fans, and long vertical shafts
- Consult John Crane for any other special requirements. M Series Couplings can be adapted to suit virtually all power transmission coupling needs.

TYPE MHS0/MHSS

M SERIES DIAPHRAGM COUPLINGS

Technical Specification

TYPE MHSO/MHSS

M SERIES DIAPHRAGM COUPLINGS

Technical Specification

TYPE MHSO/MHSS

M SERIES DIAPHRAGM COUPLINGS

METASTREAM®

Technical Specification

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