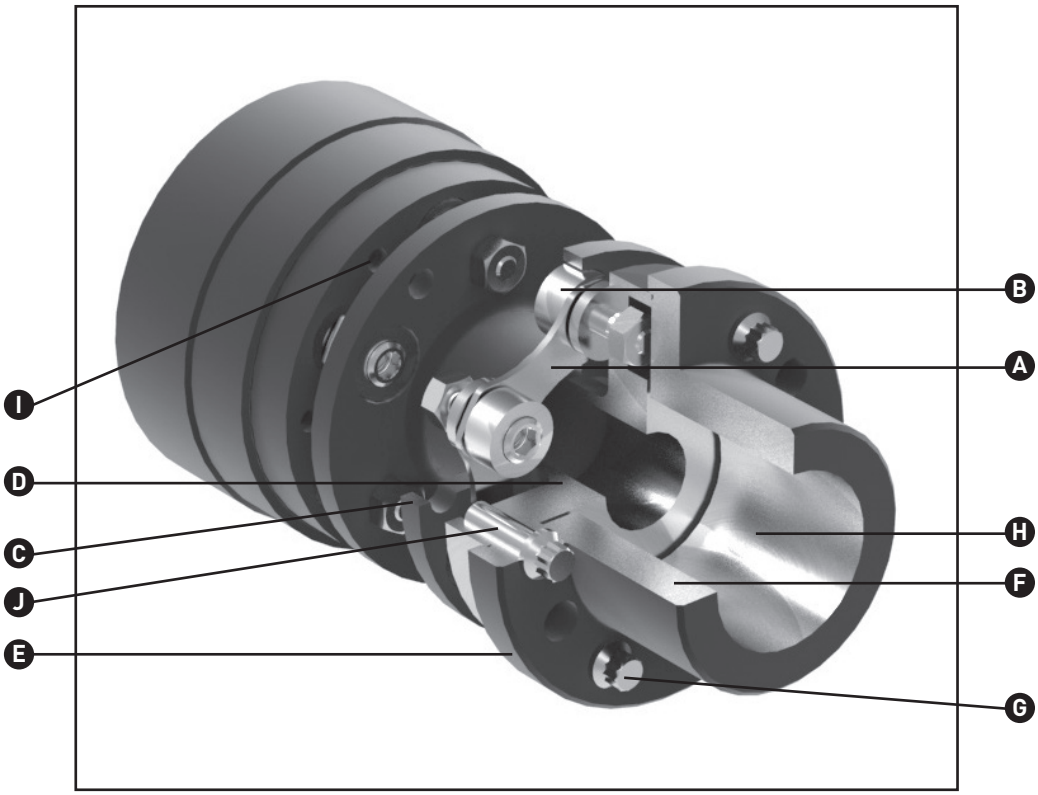
TYPE TSC/TLC

T SERIES FLEXIBLE DISC COUPLINGS

METASTREAM®

Technical Specification

A – Stainless steel flexible discs
B – Overload collars
C – Cartridge transmission unit
D – Anti-fly feature
E – Anti-corrosion treatment
F – Hubs with API puller holes
G – Robust hub bolt
H – Large shaft diameters accommodated
I – Self-locking thread
J – Compression bolt feature



Product Description

John Crane's Metastream T Series couplings incorporate scalloped, stainless-steel, flexible membranes. This design gives the most flexible solution for high-torque and misalignment conditions. This range of couplings has been specifically designed to meet the exacting standards of API 610 (ISO 13709), ISO 14691, and API 671 (ISO 10441) with exceptions.

The coupling is available as a cartridge design to maximize reliability and increases ease of installation on site. This concept ensures a high level of integral balance is maintained when the coupling is installed.

The T Series range incorporates many features listed as standard to ensure safe and trouble-free operation. This gives the user that fit-and-forget reliability expected of all John Crane's Metastream couplings.

- Easy to fit
- Meets API 610 (ISO 13709) and ISO 14691. Can be supplied to API 671 (ISO 10441), with exceptions.
- Intrinsic balance exceeds AGMA class 9
- Ideally suited to pump applications; electric motor and turbine drives in critical process industry; marine and power generation applications
- Coated carbon steel for corrosion protection
- Choice of hub configuration to suit shaft diameters
- ATEX compliant
- Coupling constructions available for -67°F to 302°F

Design Features

- **Fit and forget** - Designed for infinite life and, with correct machinery alignment, will often outlast the machines it connects
- **Overload protection** - Fitted with overload collars to prevent flexible disc rupture in the event of severe torsional overload
- **Anti-fly retention** - Specially designed anti-fly guard rings to ensure safe operation, even in the unlikely event of flexible disc and bolt failure
- **Low imposed loads** - Designed to optimize torque capability while minimizing reaction forces due to misalignment, thus maximizing the life of the machines connected
- **Zero maintenance** - Requires no lubrication or routine maintenance
- **Standard features:**
  - API 610 compliant puller holes
  - Self-locking features ensure hub bolts remain in place under all vibration conditions
  - Compression bolt features ease installation and removal of transmission unit
- **No backlash** - Torsionally stiff design ensures zero backlash, making the coupling ideal for drives where constant speed is crucial

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T SERIES FLEXIBLE DISC COUPLINGS

Technical Specification

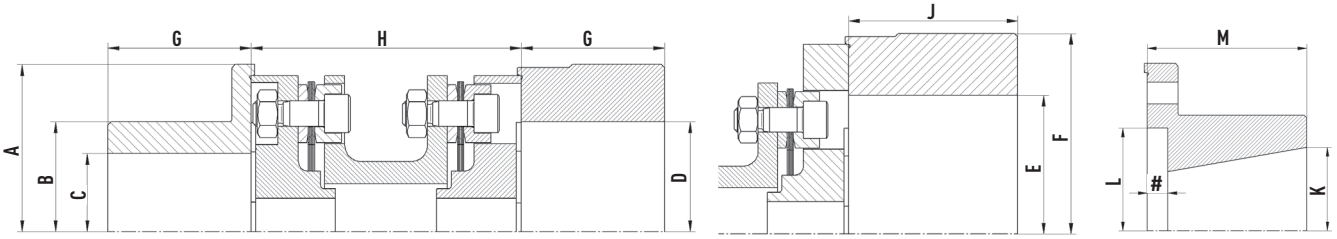
TSC Technical Data (Imperial)

Coupling Size	Rating	Max. Continuous Torque	Peak Overload Torque	Max. Speed: Standard, Large & Long Hubs		Max. Speed: Extended Hub		(2) Weight – Transmission Unit: Standard	(2) Weight – Transmission Unit: Extended	Per inch extra DBSE	(2)(3) Weight – Unbored Hub			
				Balanced	Unbalanced	Balanced	Unbalanced	Abs. Minimum DBSE	Abs. Minimum DBSE		Standard	Large	Long	Extended
	HP/100rpm	lb.in	lb.in	rpm	rpm	rpm	rpm	lbs	lbs	lbs	lbs	lbs	lbs	lbs
(1) 0014	1.9	1,186	2,372	25,500	8,700	20,000	7,800	3.725	4.295	0.23	2.05	3.84	-	6.38
0025	3.4	2,115	4,231	25,500	8,700	20,000	7,800	3.091	3.591	0.20	2.05	3.80	-	6.38
0055	7.4	4,647	9,302	20,000	7,800	16,500	6,900	5.818	6.878	0.36	3.40	6.38	-	12.20
0120	16.1	10,143	20,286	16,500	6,900	–	–	10.698	–	0.48	7.40	12.20	8.2	–
0215	28.8	18,171	36,350	14,400	6,100	–	–	18.507	–	0.67	12.17	18.97	14.7	–
0360	48.3	30,429	60,858	12,000	5,600	–	–	25.551	–	0.88	19.14	29.74	24.1	–
0500	67.1	42,300	105,700	9,500	4,000	–	–	44.300	–	0.88	46.00	–	57.5	–
0740	99.2	62,500	156,300	8,000	3,800	–	–	56.000	–	1.10	66.20	–	81.8	–
0930	124.7	78,600	196,500	7,000	3,700	–	–	71.900	–	1.30	84.60	–	110.4	–
1400	187.7	118,300	295,800	6,000	3,600	–	–	101.900	–	1.80	115.40	–	159.3	–

Notes:

1. Coupling size 0014 is a 4-link coupling with designation TDCS-0014.
2. For complete coupling weight, weights of two appropriate hubs plus a transmission unit are required.
3. Hubs will be supplied unbored, unless specified. Contact your local sales office regarding standard bore and keyway tolerances.
4. Coupling sizes shaded are non-preferred, and TLC coupling should be selected whenever possible.

TSC Typical Arrangement



Standard Hub | Large Hub | Extended Hub | Long Hub

Note: # to suit specific applications

TSC Dimensional Data (Inches)

Coupling Size	A	B	(1) C (Max)		(1) D (Max)		(1) E (Max)		F	G	(2) H - DBSE									J	(2) K (Max)	L	M
			Rect. Key (BS 4235)	Sq. Key (AGMA)	Rect. Key (BS 4235)	Sq. Key (AGMA)	Rect. Key (BS 4235)	Sq. Key (AGMA)			Min. mm		3.5 in.	4.375 in.	5 in.	7 in.	8 in.	9 in.	10 in.				
											Preferred	Absolute											
0014	3.39	2.13	1.57	1.54	2.01	1.93	2.72	2.60	4.13	1.57	3.15	2.87	X	X	X	X		X	X	1.77	–	–	–
0025	3.39	2.13	1.54	1.42	2.01	1.93	2.72	2.60	4.13	1.57	3.09	2.89	X	X	X	X		X	X	1.77	–	–	–
0055	4.13	2.72	1.93	1.73	2.72	2.60	3.54	3.39	5.12	1.77	3.57	3.34	X	X	X	X	X	X	X	2.17	–	–	–
0120	5.12	3.54	2.56	2.28	3.54	3.39	–	–	–	2.17	4.26	3.95		X	X	X	X	X	X	–	2.25	3.12	2.44
0215	5.98	4.41	3.19	2.83	4.41	4.21	–	–	–	2.44	5.32	4.87			X	X	X	X	X	–	2.88	4.00	3.03
0360	7.05	5.16	3.70	3.27	5.12	4.80	–	–	–	2.76	5.09	4.85				X		X	X	–	3.38	4.75	3.59
0500	9.02	7.13	5.00	5.00	–	–	–	–	–	3.74	5.12	5.12				X					4.63	6.50	4.75
0740	10.00	8.11	5.63	5.63	–	–	–	–	–	4.25	5.29	5.29					X				5.50	7.38	5.31
0930	10.99	8.78	6.19	6.19	–	–	–	–	–	4.53	5.66	5.66						X			5.75	8.00	6.03
1400	11.97	9.76	6.94	6.94	–	–	–	–	–	5.12	6.47	6.47							X		6.50	9.00	7.19

Notes:

1. Maximum bores shown are based on standard BS/AGMA rectangular/square keys. Unless otherwise specified, parallel bores will be machined to an IT 7 tolerance, with Js9 key-ways to DIN 6885, BS 4235 or BS 46 Pt1 (in.).
2. Accommodates NEMA standards for taper bores.
3. These DBSE sizes are more readily available. Other lengths to suit specific shaft separations are available on request.
4. The coupling sizes shaded are non-preferred, and TLC couplings should be selected whenever possible.
5. Dimensions should not be used for construction. Certified dimensions furnished upon request.

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Selection Procedure (Imperial)

1. Select appropriate service factor (SF) from table below.
2. Calculate the coupling rating (R) from:

$$R = \frac{HP \times 100 \times SF}{N}$$

Where:
HP = rated power for drive equipment (horsepower)
N = speed (rpm)

3. Select a coupling with the same or higher rating.
4. Check the hub bore capacity is suitable. If not, select a large hub or larger size coupling.
5. Check peak torque capability is suitable.
6. Check speed capability is suitable.
7. Check whether additional dynamic balancing is required.
8. Specify distance between shaft ends (DBSE).

Example:
150 HP electric motor to centrifugal pump at 3,600 rpm

$$R = \frac{150 \times 100 \times 1.0}{3{,}600}$$

R = 4.17 HP per 100 rpm

Selection: TSC – 0055
Standard hub bore up to 1.89"
Large hub bore up to 2.76"
Peak torque capability: 9,300 lb. in.

Additional dynamic balancing should not be required.

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.
*Use a minimum service factor of 1.75 on electric motor drives with VFD coupled to high inertia driven machines.

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

KSelect is an internet based selection program for the TSC/TLC. This selection program provides all necessary technical data including inertias and torsional stiffness.
Visit www.johncrane.com to access this program.

Available Options

- Spark-resistant couplings for hazardous zone operation
- Special materials for low-temperature applications and/or higher corrosion resistance
- Electrical insulation
- Adjustable shims for taper shafts
- Axially rigid construction
- Torque limiting designs (including shear pin design)

Consult John Crane for any other special requirements. John Crane couplings can be adapted to suit virtually all power transmission coupling needs.

TYPE TSC/TLC

T SERIES FLEXIBLE DISC COUPLINGS

Technical Specification

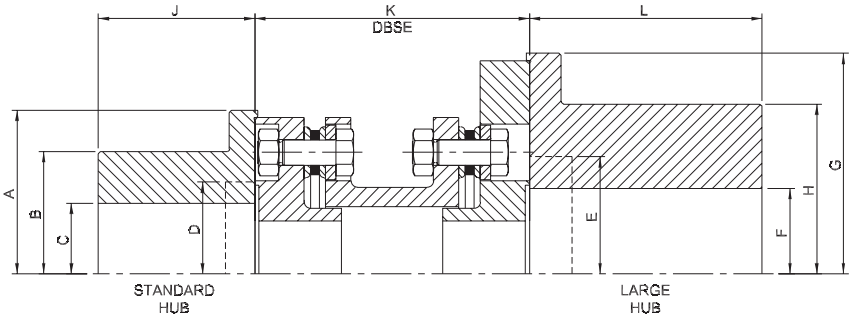
TLC Technical Data (Imperial)

Coupling Size	Rating	Max. Continuous Torque	Peak Overload Torque	Max Speed			(1) Weight – Transmission Unit		(1)(2) Weight - Unbored Hub	
				Standard Hub		Large Hub	Abs. Minimum DBSE	Per meter extra DBSE	Standard	(3) Large
				Balanced	Unbalanced	Unbalanced				
	HP/100 rpm	lb. in.	lb. in.	rpm	rpm	rpm	lb.	lb. in.	lb.	lb.
0300	40	25,350	50,700	15,300	11,500	11,300	19.9	0.9	12.9	35.7
0500	67	42,250	84,500	12,900	10,300	10,100	30.9	1.2	22.8	44.9
0750	101	63,400	126,800	11,500	9,300	9,000	44.2	1.6	35.7	62.9
1050	141	88,750	177,500	10,300	8,200	9,000	62.3	1.9	44.9	94.1
1500	201	126,750	253,500	9,300	7,600	8,200	83.3	2.4	62.9	133.3
2000	268	169,050	338,100	8,200	7,200	7,400	114	2.8	94.1	163.0
2600	349	219,750	439,500	7,600	6,600	–	150	3.4	133	163.0
3350	449	283,150	566,300	7,200	5,900	–	170	3.9	163	316.1
4250	570	359,250	718,500	6,600	5,900	–	222	4.6	210	316.1
6010	806	507,900	1,015,800	5,900	5,100	–	311	5.7	316	444.0
8500	1,140	718,400	1,436,800	5,100	4,500	–	464	6.8	444	691.3
9013	1,743	1,098,700	2,197,400	4,500	4,100	–	645	7.7	691	895.9
9017	2,280	1,436,800	2,873,600	4,100	3,800	–	875	10.1	896	1229
9021	2,816	1,774,850	3,549,700	3,800	3,200	–	1,079	11.5	1,229	2023
9036	4,828	3,042,450	6,084,900	3,200	2,900	–	1,749	16.6	2,023	2663
9049	6,571	4,141,300	8,282,600	2,900	–	–	2,345	21.2	2,663	2663

Notes:

1. For a complete coupling, weights of two appropriate hubs plus a transmission unit are required.
2. Hubs will be supplied unbored unless specified. Contact your local sales office regarding standard bore and keyway tolerances.
3. Additional weight of extended guard ring is included.

TLC Typical Arrangement



TLC Dimensional Data (Inches)

Coupling Size	A	B	(1) C (Max)	D	E	(1) F (Max)	G	H	J	K - DBSE		L
										Min.	(2) Standard	
0300	6.08	4.58	3	4.25	6.01	4.31	8.05	6.39	2.63	4.06	7	3.63
0500	7.18	5.58	3.69	5.25	6.55	4.5	9.03	6.99	3	4.69	7	3.75
0750	8.05	6.39	4.31	6.01	7.22	5	10.02	7.74	3.63	5.44	8	4.25
1050	9.03	6.99	4.5	6.55	8.35	5.88	11.25	8.87	3.75	5.94	9	4.94
1500	10.02	7.74	5	7.22	8.98	6.63	12.25	9.56	4.38	6.69	9	6
2000	11.25	8.87	5.88	8.35	10.22	7.5	12.85	10.8	4.94	7.13	10	6
2600	12.25	9.56	6.63	8.98	10.22	7.5	12.85	10.8	6	7.88	11	6
3350	12.85	10.8	7.5	10.22	12.69	9.5	15.65	13.37	6	8	11	7.63
4250	13.92	11.62	8.25	10.98	12.69	9.5	15.65	13.37	6.63	8.88	12	7.63
6010	15.65	13.37	9.5	12.69	14.16	10.63	18.1	14.93	7.63	9.94	13	8.5
8500	18.1	14.93	10.63	14.16	16.5	12.38	20.56	17.37	8.5	11.38	15	9.88
9013	20.56	17.37	12.38	16.5	17.97	13.5	22.54	18.93	9.88	12.75	–	10.75
9017	22.54	18.93	13.5	17.97	20.18	15	24.27	21.12	10.75	14.19	–	12
9021	24.27	21.12	15	20.18	23.77	17.75	28.54	24.93	12	15.25	–	14.19
9036	28.54	24.93	17.75	23.77	25.98	19.5	31.34	27.3	14.19	18.25	–	15.56
9049	31.34	27.3	19.5	25.98	–	–	–	–	15.56	20.25	–	–

Notes:

1. Maximum bores shown are based on standard BS/AGMA rectangular/square keys. Unless otherwise specified, parallel bores will be machined to an IT 7 tolerance, with Js9 key-ways to DIN 6885, BS 4235 or BS 46 Pt1 (in.).
2. These DBSE sizes are more readily available. Other lengths to suit specific shaft separations are available on request.
3. Dimensions should not be used for construction. Certified dimensions furnished upon request.

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T SERIES FLEXIBLE DISC COUPLINGS

Technical Specification

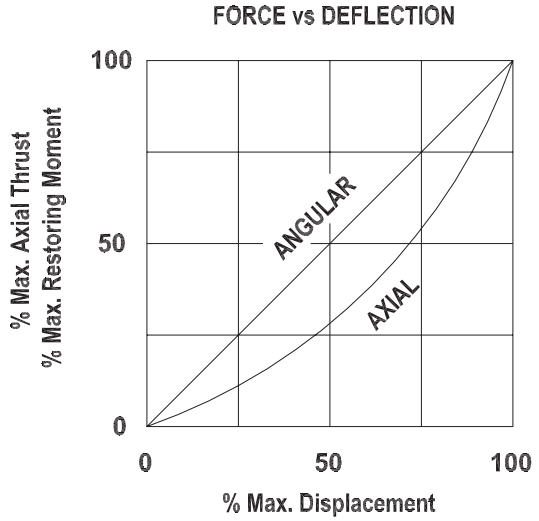
Shaft Alignment

Correct alignment of shafts is essential for reliable 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 of axial misalignment can dampen a system to prevent high-amplitude axial vibration.

TSC – Misalignment Capabilities					
Coupling Size	AXIAL (1) (3)		ANGULAR (2) (3)		(4) Max Parallel +/- inch
	Maximum per coupling	Equivalent max thrust	(5) Max. Angular	Restoring Moment at Max. Angle	
	+/- inch	lbf	deg	lb. in.	
0014	0.06	29	0.8	6	0.029
0025	0.04	94	0.5	11	0.016
0055	0.05	99	0.5	27	0.018
0120	0.08	225	0.5	76	0.021
0215	0.10	373	0.5	142	0.026
0360	0.11	384	0.5	248	0.026
0500	0.13	243	0.5	360	0.019
0740	0.15	286	0.5	421	0.023
0930	0.17	330	0.5	477	0.028
1400	0.20	607	0.5	543	0.034

TLC – Misalignment Capabilities					
Coupling Size	AXIAL (1) (3)		ANGULAR (2) (3)		(4) Max Parallel +/- inch
	Maximum per coupling	Equivalent max thrust	Max. Angular	Restoring Moment at Max. Angle	
	+/- inch	lbf	deg	lb. in.	
0300	0.055	270	0.33	220	0.011
0500	0.066	500	0.33	360	0.013
0750	0.075	630	0.33	580	0.015
1050	0.087	900	0.33	890	0.016
1500	0.094	1130	0.33	1330	0.018
2000	0.106	1350	0.33	1950	0.019
2600	0.118	1600	0.33	2480	0.021
3350	0.126	1870	0.33	3100	0.022
4250	0.138	2140	0.33	3980	0.023
6010	0.154	2570	0.33	5670	0.026
8500	0.182	3040	0.33	7940	0.03
9013	0.218	3800	0.33	11900	0.033
9017	0.242	4390	0.33	15500	0.036
9021	0.268	5040	0.33	19500	0.039
9036	0.343	6570	0.33	34200	0.047
9049	0.391	7650	0.33	46400	0.052



Notes:

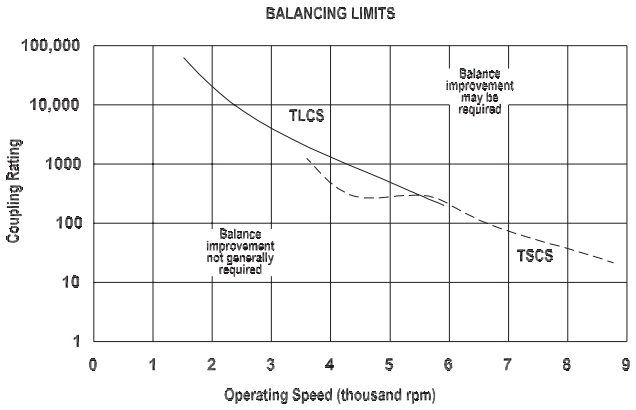
1. Meets NEMA end float specification without modification.
2. Maximum angular misalignment will reduce with rotational velocity in excess of 3,600 rpm (only on sizes 0500 to 1400).
3. Maximum angular misalignment will be 50% at the maximum axial, and vice-versa.
4. Values based on preferred min DBSE and maximum angular misalignment. Greeter parallel offset is achievable by increasing the DBSE.
5. The coupling sizes shaded are non-preferred, and TLC couplings should be selected whenever possible.

Balance Condition

These couplings are designed with a high inherent balance, due to the precision of the manufacturing process. It is important that all parts are carefully stored and fitted to maintain this integrity.

The inherent balance of the T Series meets AGMA standard 9000-D11 class 9. The adjacent chart relates the T Series rating to operating speeds on the basis of the 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 balanced, and this will be carried out after machining the bore but before cutting single keyways.



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North America
United States of America
Tel: 1-847-967-2400
Fax: 1-847-967-3915

Europe
United Kingdom
Tel: 44-1753-224000
Fax: 44-1753-224224

Latin America
Brazil
Tel: 55-11-3371-2500
Fax: 55-11-3371-2599

Middle East & Africa
United Arab Emirates
Tel: 971-481-27800
Fax: 971-488-62830

Asia Pacific
Singapore
Tel: 65-6518-1800
Fax: 65-6518-1803