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GUANGDONG KINEX HARDWARE PRODUCTS CO.,LTD.

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Kinex 坚宜佳
KIN LONG

Smart Home · Building Hardware

KINEX ALLOY STEEL TENSION ROD&CABLE
TYPICAL PRODUCTS CATALOGUE

Kinex Alloy Steel Tension Rod&Cable Typical Products Catalogue

2022
Version

www.kinex.com.cn

Comany Profile

Guangdong Kinex Hardware Products Co., Ltd., a wholly-owned subsidiary of Guangdong KINLONG Hardware Products Co., Ltd., is a large manufacturer specialized in the manufacture and supply of smart house and construction hardware products. It owns a number of high-quality management personnel, professionals in the smart house research & develop, construction structure, curtain wall technology, and R&D technicians. Depends on the excellent craftsmanship, innovative design, superior quality, Kinex products are popular at home and abroad, and has been recognized as a reliable brand in the industry of construction.

Over the years, with the spirit of " Professionalism · Pragmatism · Innovation", Kinex is always persisting in the concept of "Quality, Good Faith, Service" and independent innovation to guarantee the products quality on the basis of client demands. Unique design, short production period and better performance price ratio make Kinex gaining great reliance and reputation. The company adopts advanced management mode, which combined with systematism, standardization and informationization, and promotes on the quality management system of ISO9001：2015, the environment management system of ISO14001:2015 and the occupational health safety management ISO45001:2018. To 100% guarantee the products quality, the production process is under strict quality control from the purchasing of raw material to the delivery of finished goods from storage. Countless city landmarks have witnessed the growth of Kinex.

Since the foundation, Kinex has been centering round the development of the construction hardware industry. Now around the core of construction structure and doors & windows, curtain wall accessories, Kinex has established the diversified product system. The product types extend to door control hardware system, smart home & security, plastic and industry auxiliary product, and construction tools products, etc..

With the change of market demands, Kinex will constantly absorb advanced technology and management experience; improve and innovate consistently to meet the variable and diversified demands of market, to set up a good and healthy company image as a reliable partner.

Kinex Development history

Guangdong Kinex Hardware Products Co., Ltd. is a wholly-owned subsidiary of Guangdong Kinlong Hardware Products Co., Ltd. It is a large-scale manufacturer specializing in the production and supply of architectural hardware products. Kinex series products sell widely at home and abroad with exquisite craftsmanship, innovative design and excellent quality, and has become a reliable brand in the construction industry.

2006
Dongguan Kinex hardware products Co.Ltd estabilised

2007
Awarded the "ISO9001:2000 Certificate"

2008
Kinex was rated "Guangdong Abide by Contract & Good Creditworthiness Enterprise"

SGS awarded Kinex the"ISO9001:2008 Certificate"

2009
Kinex became the member unit of China Steel Structure Association of Spatial Structure Branch

Kinex become a unit member of the Chinese Society of Heat Treatment

2010
Kinex become the member unit of China Construction Metal Structure Association

2011
Kinex was rated "Guangdong Abide by Contract & Good Creditworthiness Enterprise"for 2 consecutive years(2010-2011).

2012
Awarded "National Industrial Product Production Licence"by National GeneralAdministration of Quality Supervision, Inspection(AQSIQ)

2013
Renamed"Guangdong Kinex Hardware Products Co.,Ltd"

Guangdong Provincial Department of Science and Technology Agency aranted Kinex the "High Technlogy Product Certicate of Guangdong"

China Steel Structure Association granted Kinex the first prize of "China Steel StructureAssociation Science and Technology Award"

Kinexproducts was rated for "2013 annual construction curtain wall recommended products"by China Building Decoration ASsociation Curtain wall Project Committee.

Kinex was rated"Guangdong Abide by Contract & Good Creditworthiness Enterprise"for 3 consecutive years(2010-2012)

2014
Kinex was awarded "The 3rd Level Certificate of Safety Production Standardization Enterprise"

Kinex products was rated for "2014 annual construction curtain wall recommended products"by China Building Decoration Association Curtain wall Project Committee.

Kinex steel rod products Passed the EU CE certification

Kinex was rated"Guangdong Abide by Contract & Good Creditworthiness Enterprise"for 4 consecutive years(2010-2013)

2015
Kinex products was rated for"2015 annual construction curtain wall recommended products"by China Building Decoration Association Curtain wall Project Committee.

Kinex products won the"Technological Innovation Award"in the 9th Spatial Structure Award held by the Space Structure Branch of China Steel Structure Association.

Kinex was rated"Guangdong Abide by Contract & Good Creditworthiness Enterprise"for 5 consecutive years(2010-2014)

2016
Kinex wins the second award of Progress in Science and Technology by Guandzhou Government.

Kinex products was named for "2016 annual construction curtain wall recommended products"by China Building Decoration Association Curtain wall Project Committee.

Kinex products were awarded"the most innovative supporting products"in the 2nd building doors & windows curtain wall industry FC Award.

Kinex was rated"Guangdong Abide by Contract & Good Creditworthiness Enterprise"for 6 consecutive years(2010-2015)

2017
Kinex products was named for "2017 Annual Construction Curtain Wall Recommended Products"by China Building Decoration Association Curtain wall Project Committee.

Kinex becomes the member of China Construction Decoration Association

Kinex wins the award as"Excellent Cooperation Unit" in the Hongkong-Zhuhai-Macao Bridge Project.

Kinex wins the honor of 0ptimization of Popularization and Application"by Plastic Door Committee of China Construction Metal Structure Association.

Kinex was rated"Guangdong Abide by Contract & Good Creditworthiness Enterprise"for 7 consecutive years(2010-2016)

2018
Kinex products was named for"2018 Annual Construction Curtain Wall Recommended Products " by China Building Decoration Association Curtain wall Project Committee.

Kinex products were awarded"the Most Innovative Supporting Products" in the 3rd Building Doors & Windows Curtain Wall Industry FC Award.

Kinex was rated"Guangdong Abide by Contract & Good Creditworthiness Enterprise"for 8 consecutive years(2010-2017)

Jian Yijia was named "Member Unit of China Building Decoration Association"

2019
Kinex products were designated as "2019 Recommended Products in the Building Curtain Wall Industry" by the Curtain Wall Engineering Committee of China Building Decoration Association

Kinex was named "Member Unit of China Building Decoration Association"

Kinex was rated"Guangdong Abide by Contract & Good Creditworthiness Enterprise"for 9 consecutive years (2010-2018)

SGS awarded our company "IS045001:2018 certificate"

SGS awarded our company "IS014001:2015 certificate"

2020
Kinex products were designated as "2020 Recommended Products of Building Curtain Wall Industry" by the Curtain Wall Engineering Committee of China Building Decoration Association

The People's Government of Guangdong Province awarded the company "Second Prize of Science and Technology Progress Award of Guangdong Province"

Kinex won the "High-tech Enterprise"

Guangdong Provincial Department of Science and Technology awarded the company "Guangdong High-tech Product Certificate"

Kinex obtains the Certificate of Membership of the Tenth Council of China Civil Engineering Society

Kinex was rated"Guangdong Abide by Contract & Good Creditworthiness Enterprise"for 10 consecutive years (2010-2019)

Kinex won the "Technical Research and Development Innovative Products" in the 4th Jinxuan Award for Building Doors, Windows and Curtain Wall Industry

China Steel Structure Association awarded the company "China Steel Structure Association Technology Innovation Award"

2021
Kinex won the second prize of the 2020 China Construction Science and Technology Award

Kinex won the China Steel Structure Association Science and Technology Award Special Award

Kinex was approved by Guangdong Province Prestressed Steel Structure Engineering Technology Research Center

Kinex was rated"Guangdong Abide by Contract & Good Creditworthiness Enterprise"for 11 consecutive years (2010-2020)

Kinex Full Locked coil Cable was selected as the 2020 Guangdong Province Famous High-tech Product

CONTENT

Introduction of Tension Cable& Rod Workshop

As a famous tension cable & rod manufacturer, Guangdong Kinex Hardware Products Co.,Ltd.,owns professional steel structure plants manufacturing steel tension cable & rod,The plant takes the area of 40000㎡ with 220m length and 180m width,also can produce Galfan cable， which diameter can reach φ160mm (1x817) ， and the dirameter of high strength alloy steel tension rod's diameter in the range of φ16-φ250.


Through a lot of research and experiments, we invented the biggest steel strand twisting equipment and tensioning equipment. Combined with the intelligence integration twisting craft which we grope by ourselves, the produced diameter of zinc-5%aluminium-rare earth alloy coating cable can up to φ160mm ， while the section area structure can reach to 1x817 and strength of steel wire is 1670MPa, the minimum breaking force of zinc-5%aluminium-rare earth alloy coating cable can be over 2600tons, almost satisfy the demands of material selecting of large-scale public stadiums..


Many years of production experience, Kinex has developed a complete set of heat treatment technology of tension rod, which has totally solved the heat treatment problem of high strength rod body with big dimension.At present, the 650 grade tension rod has a maximum diameter of 250mm, 850 grade tension rod has a maximum diameter of 130mm, also the 1100 grade tension rod has a maximum diameter of 80mm.

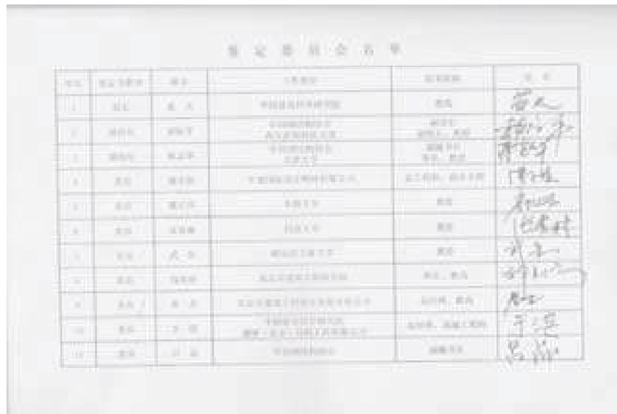

Company qualification and honors

Our company has passed ISO9001:2015 and ISO14001:2015 and ISO45001-2018 system certification and CE certification.
Till now the company has more than 40 patented items related to alloy steel cable and alloy steel tension rod products.

Won the second prize of the National Science and Technology Progress Award and a number of spatial structure and steel structure awards.

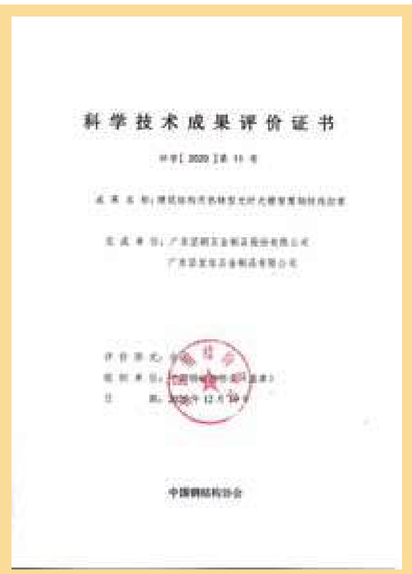
Galfan Cable/ Full Locked Coil Cable/fiber Bragg Grating Smart Cable All Passed Appraisal of Scientific and Technological Achievements


科学技术成果鉴定证书


鉴定委员会名单


建设行业科技成果评估证书


评估委员会名单


科学技术成果评价证书


专家名单

Products quality control

1.Product implementation standard

Galfan Cable: implement VB/T4543 <Zinc-5% Aluminum Rare Earth Alloy Coating cable> standard

Full Locked Cable: implement YB/T5295 <Locked Cable> and EN12358-10<General structural use single twist wire rope>

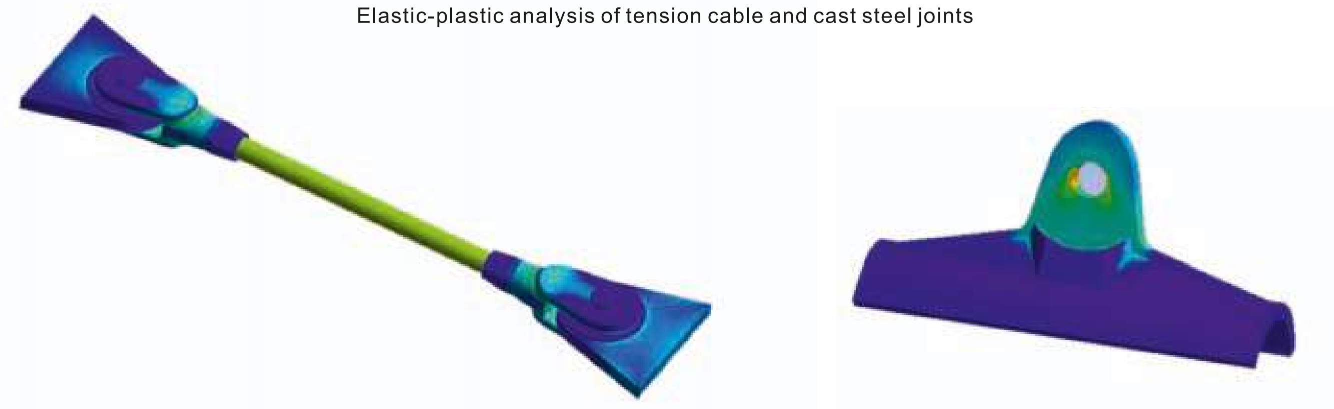
Hot extruded polyethylene cable:implement GB/T18365 <Hot-extruded polyethylene high-strength steel wire cable for cable-stayed bridge>

Steel Rod: implement GB/T20934 <steel rod>

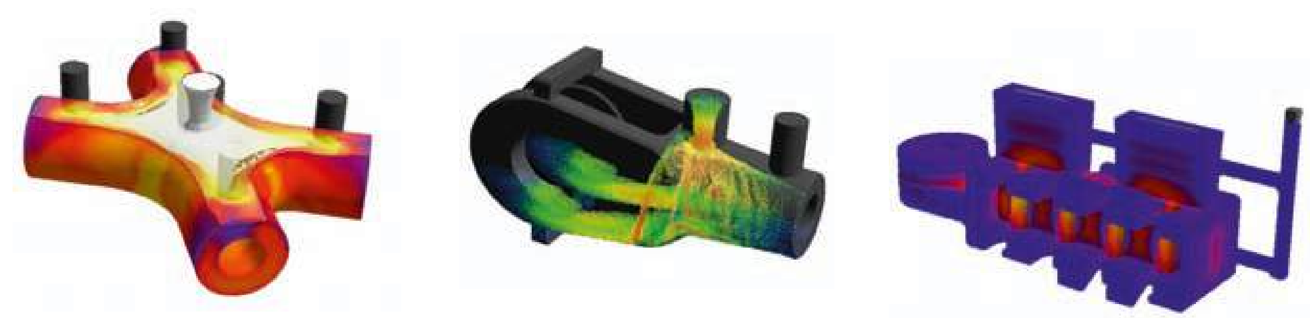
2.Product simulation analysis

Tension cable,tension rod and cast steel joint are the important force transferring components of building structure.In the process of product design, we firstly adopt the elastic-plastic and casting finite element simulation analysis, then optimize the product structure to improve the product quality, shorten the design cycle, and make the product more safe and reliable.

Elastic-plastic analysis of tension cable and cast steel joints



Elastic-plastic analysis of tension rod and cast steel joints



Simulation analysis of casting finite element

3. Material quality ensure system

The high-quality raw material of tension cable and rod are all purchased from well-known domestic manufacturers with quality certificate of raw materials.

4.Testing equipment and the pivotal process quality controlling

The laboratoryof Kinex has the qualification approval from CNAS. The raw material, fittings and products are all tested professionallyin the laboratory, which is responsible

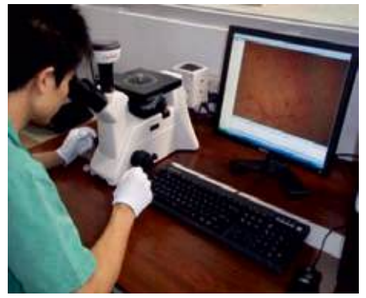
200 Tons Vertical Tensile Machine

600 Tons Horizontal Tensile Machine

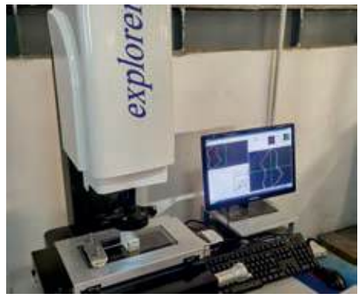
4000 Tons Horizontal Tensile Machine

Direct-reading Spectrum Analyzer

Impact Testing Machine



Metallurgical Structure Analysis

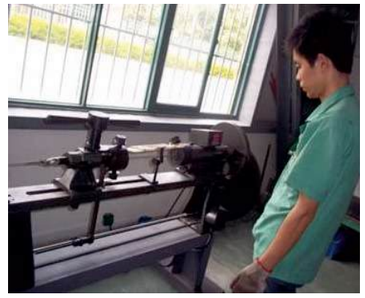


3D projector

Ultrasonic Flaw inspection

Magnetic particle inspection

Tensile Testing for Steel Wire



Torsion Testing for Steel Wire

Bending Testing for SteelWire

Wrapping Testing for Steel Wire

Coating Quality Testing for Steel Wire

Salt Spray Testing

Locked Coil Strand

Locked Coil Strand(LC)

Inc-5% Aluminum Rare Earth Alloy Coating

Nominal strength of steel wire 1570Mpa, Elastic modulus: (1.65±0.1) x10^5 N/mm²

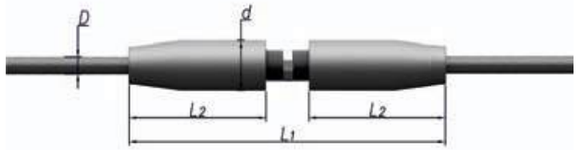
Nominal Diameter of Steel Strand (mm) (mm)	weight (kg/100m) (kg/100m)	Effective Section Area of Steel Strand (mm²) (mm^2)	Minimum Breaking Force of Steel Strand (KN) (kN)
Φ30	477	594	858
Φ35	649	808	1170
Φ40	920	1100	1580
Φ45	1200	1410	2000
Φ50	1400	1740	2470
Φ55	1800	2170	3020
Φ60	2200	2590	3590
Φ65	2500	2980	4220
Φ70	2900	3420	4890
Φ75	3300	3910	5620
Φ80	3700	4420	6390
Φ85	4200	4990	7210
Φ90	4600	5560	8090
Φ95	5100	6150	9110
Φ100	5600	6760	10100
Φ105	6400	7650	11100
Φ110	7100	8460	12200
Φ115	7600	9110	13400
Φ120	8200	9910	14500
Φ125	8900	10700	15800
Φ130	9700	11470	16200
Φ135	10400	12370	17500
Φ140	11200	13300	18700

Implementing Standards:EN12385-10(Steel wire ropes-Safety-Part 10: Spiral ropes forgeneral structural applications)

Other specifications,strength and corrosion resistance products can be provided as required.

Ringy Cable Anchor with Adjustable Screw Rod

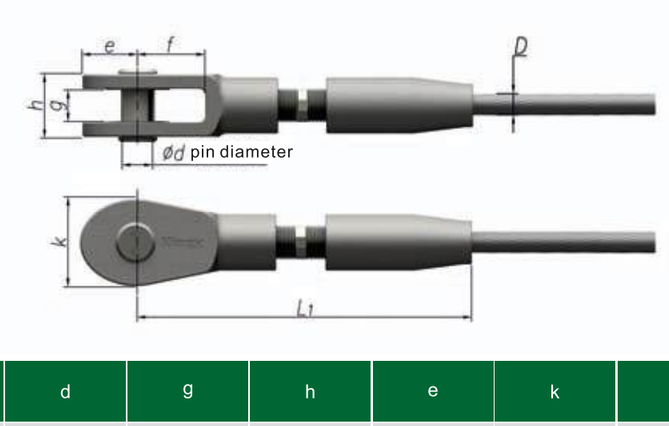
Product:LH02



D	L_1	L_2	d	调节量
Φ30	650	270	95	±90
Φ35	694	292	100	±90
Φ40	850	360	125	±110
Φ45	890	380	135	±110
Φ50	960	415	150	±110
Φ55	1020	445	165	±110
Φ60	1130	490	180	±130
Φ65	1200	520	195	±130
Φ70	1250	545	205	±130
Φ75	1300	570	220	±130
Φ80	1360	600	230	±130
Φ85	1420	630	250	±130
Φ90	1520	670	260	±140
Φ95	1630	725	290	±140
Φ100	1690	755	310	±140
Φ105	1770	785	315	±150
Φ110	1820	810	325	±150
Φ115	1880	840	340	±150
Φ120	1940	870	350	±150
Φ125	1990	895	365	±150
Φ130	2050	925	380	±150
Φ135	2110	955	390	±150
Φ140	2170	985	400	±150

Adjustable Anchor with Fork Head
Product:LT02

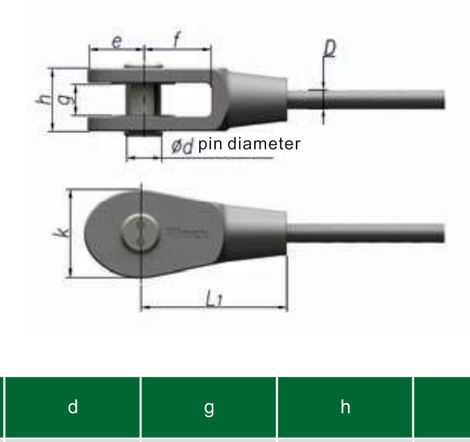
meet EN1993-1-8 requirement



D	L_1	d	g	h	e	k	f	Unilateral regulating variable
Φ30	645	57	50	105	90	140	115	±90
Φ35	690	65	55	115	104	162	130	±90
Φ40	845	79	70	145	124	195	160	±110
Φ45	880	88	75	155	140	215	170	±110
Φ50	950	102	90	180	165	250	195	±110
Φ55	1005	107	95	190	175	270	210	±110
Φ60	1120	117	105	210	185	290	230	±130
Φ65	1185	126	110	220	205	315	245	±130
Φ70	1230	136	115	235	220	340	260	±130
Φ75	1285	145	125	250	235	365	280	±130
Φ80	1340	155	130	265	250	385	295	±130
Φ85	1400	166	140	285	265	410	315	±130
Φ90	1495	174	145	295	275	430	330	±140
Φ95	1600	186	160	320	300	475	360	±140
Φ100	1660	196	170	340	315	500	380	±140
Φ105	1735	206	175	350	330	520	395	±150
Φ110	1790	215	190	370	345	540	415	±150
Φ115	1840	222	195	385	355	560	425	±150
Φ120	1895	228	200	395	370	575	440	±150
Φ125	1945	236	205	405	385	600	455	±150
Φ130	2005	245	210	420	395	620	475	±150
Φ135	2065	252	215	430	405	635	495	±150
Φ140	2125	256	220	440	415	655	515	±150

Fixed Anchor with Fork Head
Product:LD02

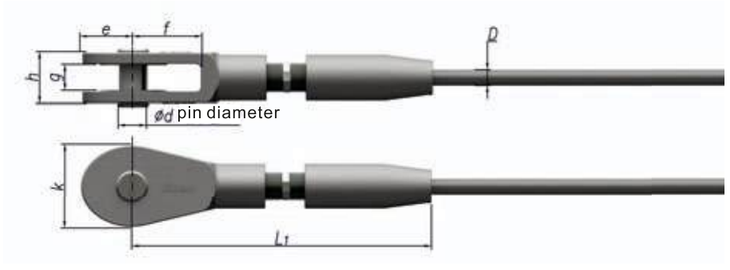
meet EN1993-1-8 requirement



D	L_1	d	g	h	e	k	f
Φ30	240	57	50	105	90	140	115
Φ35	270	65	55	115	104	162	130
Φ40	330	79	70	145	124	195	160
Φ45	355	88	75	155	140	215	170
Φ50	405	102	90	180	165	250	195
Φ55	435	107	95	190	175	270	210
Φ60	475	117	105	210	185	290	230
Φ65	510	126	110	220	205	315	245
Φ70	545	136	115	235	220	340	260
Φ75	585	145	125	250	235	365	280
Φ80	615	155	130	265	250	385	295
Φ85	655	166	140	285	265	410	315
Φ90	690	174	145	295	275	430	330
Φ95	755	186	160	320	300	475	360
Φ100	795	196	170	340	315	500	380
Φ105	830	206	175	350	330	520	395
Φ110	865	215	190	370	345	540	415
Φ115	895	222	195	385	355	560	425
Φ120	930	228	200	395	370	575	440
Φ125	960	236	205	405	385	600	455
Φ130	1000	245	210	420	395	620	475
Φ135	1040	252	215	430	405	635	495
Φ140	1080	256	220	440	415	655	515

Adjustable Anchor with Fork Head
Product:LT03

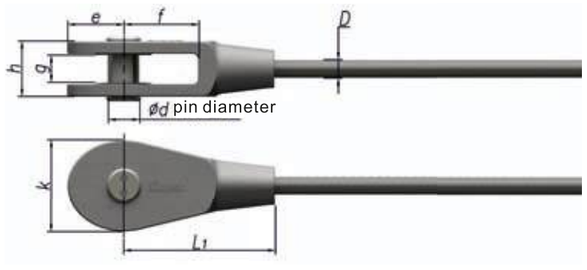
It accrds the strength check requirements and structural requirements of Gb50017 "Standards for Design of Steel Structures".



D	L_1	d	g	h	e	k	f	Unilateral adjustment
Φ30	685	57	50	105	120	195	155	± 90
Φ35	725	65	55	115	130	215	165	± 90
Φ40	875	79	70	145	155	255	190	±110
Φ45	905	88	75	155	165	275	195	±110
Φ50	995	102	90	180	190	305	240	±110
Φ55	1055	107	95	190	195	325	260	±110
Φ60	1170	117	105	210	215	355	280	±130
Φ65	1235	126	110	220	225	370	295	±130
Φ70	1285	136	115	235	240	400	315	±130
Φ75	1325	145	125	250	255	415	320	±130
Φ80	1385	155	130	265	270	445	340	±130
Φ85	1460	166	140	285	290	480	375	±130
Φ90	1560	174	145	295	305	500	395	±140
Φ95	1680	186	160	320	320	525	440	±140
Φ100	1750	196	170	340	335	555	470	±140
Φ105	1830	206	175	350	350	575	490	±150
Φ110	1915	215	190	370	360	590	540	±150
Φ115	1970	222	195	385	375	620	555	±150
Φ120	2015	228	200	395	385	635	560	±150
Φ125	2050	236	205	405	395	655	560	±150
Φ130	2110	245	210	420	415	680	580	±150
Φ135	2165	252	215	430	425	700	595	±150
Φ140	2220	256	220	440	435	715	610	±150

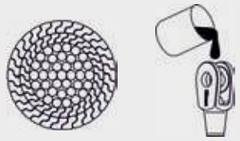
Fixed Anchor with Fork Head
Product:LD03

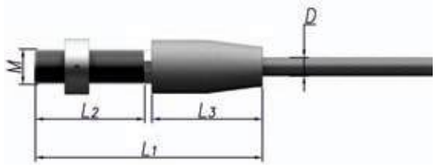
It accrds with the standard of GB50017 " Standards for Design of Steel Structures" for strength check requirements and structural requirements.



D	L_1	d	g	h	e	k	f
Φ30	280	57	50	105	120	195	155
Φ35	305	65	55	115	130	215	165
Φ40	360	79	70	145	155	255	190
Φ45	380	88	75	155	165	275	195
Φ50	450	102	90	180	190	305	240
Φ55	485	107	95	190	195	325	260
Φ60	525	117	105	210	215	355	280
Φ65	560	126	110	220	225	370	295
Φ70	600	136	115	235	240	400	315
Φ75	625	145	125	250	255	415	320
Φ80	660	155	130	265	270	445	340
Φ85	715	166	140	285	290	480	375
Φ90	755	174	145	295	305	500	395
Φ95	835	186	160	320	320	525	440
Φ100	885	196	170	340	335	555	470
Φ105	925	206	175	350	350	575	490
Φ110	990	215	190	370	360	590	540
Φ115	1025	222	195	385	375	620	555
Φ120	1050	228	200	395	385	635	560
Φ125	1065	236	205	405	395	655	560
Φ130	1105	245	210	420	415	680	580
Φ135	1140	252	215	430	425	700	595
Φ140	1175	256	220	440	435	715	610

Adjustable Screw Anchor
Product:LL02

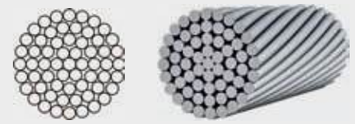




D	L_1	L_2	L_3	T	M
Φ30	380	180	180	45	M56×5.5
Φ35	442	220	202	51	M64×6
Φ40	535	265	250	64	M80×6
Φ45	590	300	270	68	M85×6
Φ50	665	340	305	76	M95×6
Φ55	720	365	335	84	Tr105×8
Φ60	750	370	360	92	Tr115×8
Φ65	800	380	390	100	Tr125×8
Φ70	850	405	415	104	Tr130×8
Φ75	875	405	440	112	Tr140×8
Φ80	925	425	470	120	Tr150×10
Φ85	970	440	500	128	Tr160×10
Φ90	1015	445	530	136	Tr170×10
Φ95	1110	485	585	152	Tr190×10
Φ100	1150	495	615	160	Tr200×12
Φ105	1195	510	635	160	Tr200×12
Φ110	1260	550	660	168	Tr210×12
Φ115	1320	580	690	176	Tr220×12
Φ120	1370	600	720	184	Tr230×12
Φ125	1395	600	745	192	Tr240×12
Φ130	1435	610	775	200	Tr250×12
Φ135	1475	620	805	208	Tr260×12
Φ140	1515	630	835	216	Tr270×12

Spiral Strand Product

Spiral Strand(SS)
Zinc-5% Aluminum Rare Earth Alloy Coating
Elastic modulus: (1.60±0.1) x10^5 N/mm^2



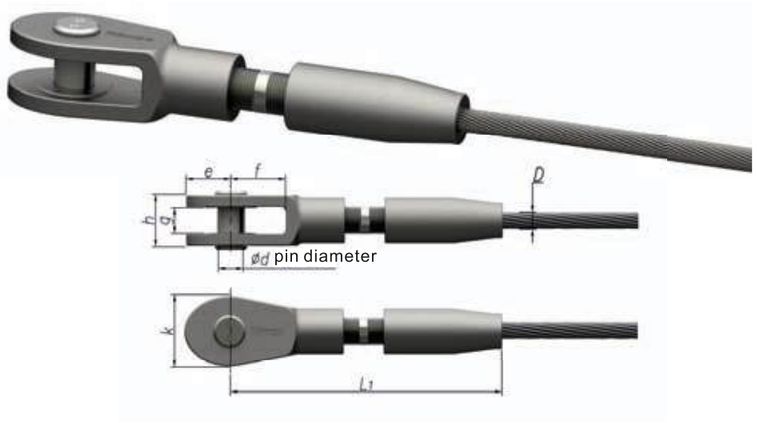
Nominal Diameter of Steel Strand (mm)	Weight (kg/100m)	Effective Section Area of Steel Strand (mm^2)	Minimum Breaking Load of Steel Strand (kN) / 1770MPa	Minimum Breaking Load of Steel (kN) / 1770MPa
Φ12	70	93	140	149
Φ14	102	125	189	200
Φ16	124	153	230	243
Φ18	157	182	267	283
Φ20	193	244	359	381
Φ22	234	298	437	464
Φ24	278	352	517	548
Φ26	327	403	592	628
Φ28	379	447	656	696
Φ30	434	560	823	873
Φ32	493	600	883	936
Φ36	624	782	1150	1220
Φ40	783	978	1440	1530
Φ44	933	1160	1710	1810
Φ48	1110	1380	2010	2130
Φ50	1200	1510	2220	2350
Φ55	1460	1790	2630	2790
Φ60	1730	2110	3100	3290
Φ65	2040	2490	3670	3890
Φ70	2360	2930	4310	4570
Φ75	2730	3320	4880	5270
Φ80	3080	3770	5530	5860
Φ85	3480	4260	6260	6630
Φ90	3900	4900	7210	7640
Φ95	4350	5320	7820	8290
Φ100	4820	5990	8800	9330
Φ105	5310	6500	9550	10120
Φ110	5830	7180	10560	11190
Φ115	6370	7800	11460	12140
Φ120	6940	8490	12190	12920
Φ125	7530	9210	13230	14020
Φ130	8140	9960	14310	15170
Φ135	8780	10740	15430	16350
Φ140	9440	11620	16680	17680

Note:
1.The reduction coefficient of the injected tension cable is 1.0,tension cable static breaking load should over the minimum broken force 95% of spiral strand,which satisfied with YB/T4543-2016 Zinc-5%Aluminum-rare Earth Alloy Coating Steel Tension Cable for Construction Engineering.
2.The reduction coefficient of cramped cable is 0.9,which accord with JG/T201-2007 Curtain Wall Tension Cable cramped Pipe Connector for Construction Engineering.

Other specifications,strength and corrosion resistance products can be provided as required.

Adjustable Anchor with Fork Head
Product:ST02

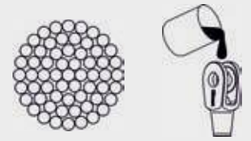
meet EN1993-1-8 requirement

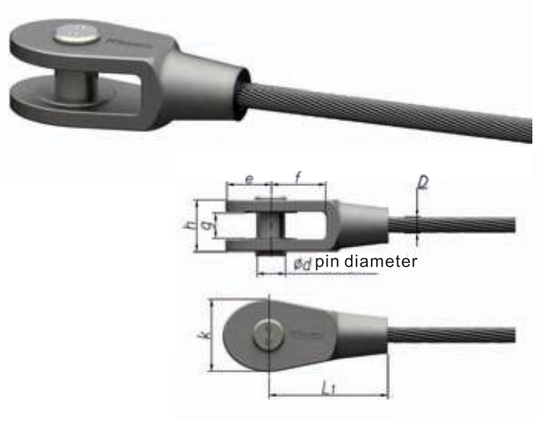


D	L1	d	g	h	e	k	f	Unilateral regulating variable
Φ20	460	37	34	70	60	94	75	±70
Φ22	480	41	36	76	65	102	80	±70
Φ24	510	44	40	82	70	112	90	±70
Φ26	555	47	42	86	75	120	95	±80
Φ28	580	49	44	90	80	125	100	±80
Φ30	605	55	50	100	90	140	110	±80
Φ32	645	57	50	105	90	140	115	±90
Φ36	690	65	55	115	104	162	130	±90
Φ40	745	73	65	135	115	182	145	±90
Φ44	845	79	70	145	124	195	160	±110
Φ48	880	88	75	155	140	215	170	±110
Φ50	905	93	80	165	150	225	180	±110
Φ55	950	102	90	180	165	250	195	±110
Φ60	1005	107	95	190	175	270	210	±110
Φ65	1120	117	105	210	185	290	230	±130
Φ70	1185	126	110	220	205	315	245	±130
Φ75	1230	136	115	235	220	340	260	±130
Φ80	1285	145	125	250	235	365	280	±130
Φ85	1340	155	130	265	250	385	295	±130
Φ90	1400	166	140	285	265	410	315	±130
Φ95	1495	174	145	295	275	430	330	±140
Φ100	1550	182	155	310	295	455	350	±140
Φ105	1600	186	160	320	300	475	360	±140
Φ110	1660	196	170	340	315	500	380	±140
Φ115	1735	206	175	350	330	520	395	±150
Φ120	1790	215	190	370	345	540	415	±150
Φ125	1840	222	195	385	355	560	425	±150
Φ130	1895	228	200	395	370	575	440	±150
Φ135	1945	236	205	405	385	600	455	±150
Φ140	2005	245	210	420	395	620	475	±150

Fixed Anchor with Fork Head
Product:SD02

meet EN1993-1-8 requirement

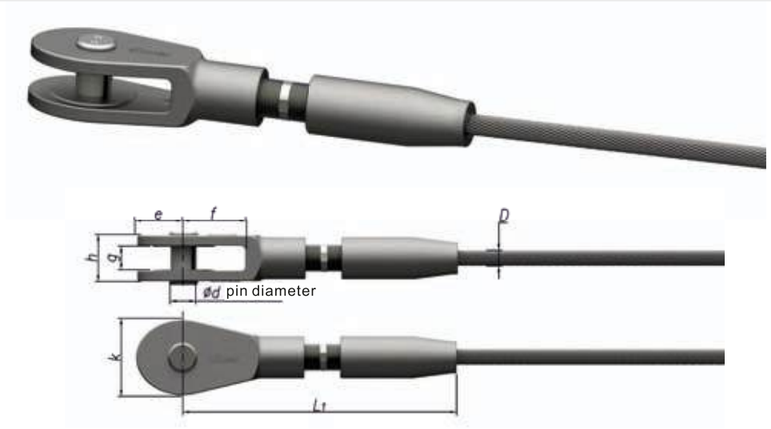




D	L1	d	g	h	e	k	f
Φ20	155	37	34	70	60	94	75
Φ22	165	41	36	76	65	102	80
Φ24	185	44	40	82	70	112	90
Φ26	195	47	42	86	75	120	95
Φ28	210	49	44	90	80	125	100
Φ30	225	55	50	100	90	140	110
Φ32	240	57	50	105	90	140	115
Φ36	270	65	55	115	104	162	130
Φ40	300	73	65	135	115	182	145
Φ44	330	79	70	145	124	195	160
Φ48	355	88	75	155	140	215	170
Φ50	370	93	80	165	150	225	180
Φ55	405	102	90	180	165	250	195
Φ60	435	107	95	190	175	270	210
Φ65	475	117	105	210	185	290	230
Φ70	510	126	110	220	205	315	245
Φ75	545	136	115	235	220	340	260
Φ80	585	145	125	250	235	365	280
Φ85	615	155	130	265	250	385	295
Φ90	655	166	140	285	265	410	315
Φ95	690	174	145	295	275	430	330
Φ100	725	182	155	310	295	455	350
Φ105	755	186	160	320	300	475	360
Φ110	795	196	170	340	315	500	380
Φ115	830	206	175	350	330	520	395
Φ120	865	215	190	370	345	540	415
Φ125	895	222	195	385	355	560	425
Φ130	930	228	200	395	370	575	440
Φ135	960	236	205	405	385	600	455
Φ140	1000	245	210	420	395	620	475

Adjustable Anchor with Fork Head
Product:ST03

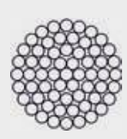
It accrds the strength check requirements and structural requirements of GB50017 "Standards for Design of Steel Structures".

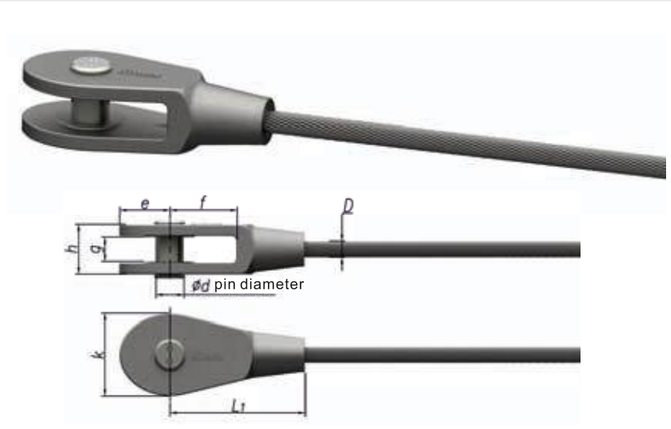


D	L1	d	g	h	e	k	f	Unilateral regulating variable
Φ20	515	37	34	70	85	140	130	±70
Φ22	540	41	36	76	95	150	140	±70
Φ24	560	44	40	82	95	155	140	±70
Φ26	600	47	42	86	100	165	140	±80
Φ28	620	49	44	90	105	170	140	±80
Φ30	645	55	50	100	115	185	150	±80
Φ32	685	57	50	105	120	195	155	±90
Φ36	725	65	55	115	130	215	165	±90
Φ40	775	73	65	135	145	240	175	±90
Φ44	875	79	70	145	155	255	190	±110
Φ48	905	88	75	155	165	275	195	±110
Φ50	935	93	80	165	175	290	210	±110
Φ55	995	102	90	180	190	305	240	±110
Φ60	1055	107	95	190	195	325	260	±110
Φ65	1170	117	105	210	215	355	280	±130
Φ70	1235	126	110	220	225	370	295	±130
Φ75	1285	136	115	235	240	400	315	±130
Φ80	1325	145	125	250	255	415	320	±130
Φ85	1385	155	130	265	270	445	340	±130
Φ90	1460	166	140	285	290	480	375	±130
Φ95	1560	174	145	295	305	500	395	±140
Φ100	1625	182	155	310	310	515	425	±140
Φ105	1680	186	160	320	320	525	440	±140
Φ110	1750	196	170	340	335	555	470	±140
Φ115	1830	206	175	350	350	575	490	±150
Φ120	1915	215	190	370	360	590	540	±150
Φ125	1970	222	195	385	375	620	555	±150
Φ130	2015	228	200	395	385	635	560	±150
Φ135	2050	236	205	405	395	655	560	±150
Φ140	2110	245	210	420	415	680	580	±150

Fixed Anchor with Fork Head
Product:ST03

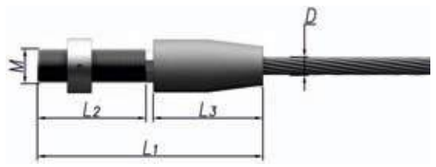
It accrds the strength check requirements and structural requirements of GB50017 " Standardsfor Design of Steel Structures".





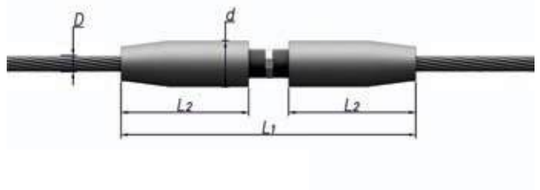
D	L1	d	g	h	e	k	f
Φ20	210	37	34	70	85	140	130
Φ22	225	41	36	76	95	150	140
Φ24	235	44	40	82	95	155	140
Φ26	240	47	42	86	100	165	140
Φ28	250	49	44	90	105	170	140
Φ30	265	55	50	100	115	185	150
Φ32	280	57	50	105	120	195	155
Φ36	305	65	55	115	130	215	165
Φ40	330	73	65	135	145	240	175
Φ44	360	79	70	145	155	255	190
Φ48	380	88	75	155	165	275	195
Φ50	400	93	80	165	175	290	210
Φ55	450	102	90	180	190	305	240
Φ60	485	107	95	190	195	325	260
Φ65	525	117	105	210	215	355	280
Φ70	560	126	110	220	225	370	295
Φ75	600	136	115	235	240	400	315
Φ80	625	145	125	250	255	415	320
Φ85	660	155	130	265	270	445	340
Φ90	715	166	140	285	290	480	375
Φ95	755	174	145	295	305	500	395
Φ100	800	182	155	310	310	515	425
Φ105	835	186	160	320	320	525	440
Φ110	885	196	170	340	335	555	470
Φ115	925	206	175	350	350	575	490
Φ120	990	215	190	370	360	590	540
Φ125	1025	222	195	385	375	620	555
Φ130	1050	228	200	395	385	635	560
Φ135	1065	236	205	405	395	655	560
Φ140	1105	245	210	420	415	680	580

Adjustable Screw Anchor
Product:SL02



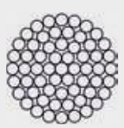
D	L_1	L_2	L_3	T	M
Φ20	265	130	115	29	M36×4
Φ22	280	135	125	31	M39×4
Φ24	310	150	140	36	M45×4.5
Φ26	325	155	150	38	M48×5
Φ28	343	160	163	42	M52×5
Φ30	364	170	174	45	M56×5.5
Φ32	380	180	180	45	M56×5.5
Φ36	442	220	202	51	M64×6
Φ40	490	240	230	60	M75×6
Φ44	535	265	250	64	M80×6
Φ48	590	300	270	68	M85×6
Φ50	600	300	280	72	M90×6
Φ55	665	340	305	76	M95×6
Φ60	720	365	335	84	Tr105×8
Φ65	750	370	360	92	Tr115×8
Φ70	800	380	390	100	Tr125×8
Φ75	850	405	415	104	Tr130×8
Φ80	875	405	440	112	Tr140×8
Φ85	925	425	470	120	Tr150×10
Φ90	970	440	500	128	Tr160×10
Φ95	1015	445	530	136	Tr170×10
Φ100	1065	470	555	144	Tr180×10
Φ105	1110	485	585	152	Tr190×10
Φ110	1150	495	615	160	Tr200×12
Φ115	1195	510	635	160	Tr200×12
Φ120	1260	550	660	168	Tr210×12
Φ125	1320	580	690	176	Tr220×12
Φ130	1370	600	720	184	Tr230×12
Φ135	1395	600	745	192	Tr240×12
Φ140	1435	610	775	200	Tr250×12

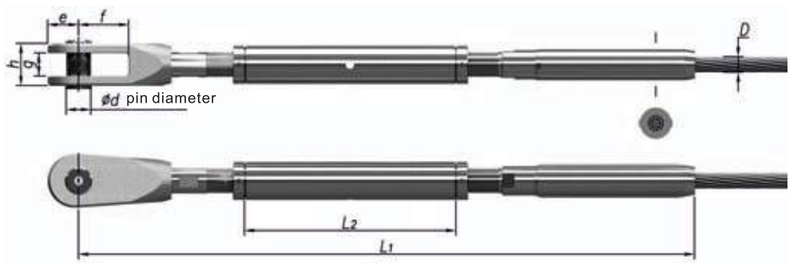
Ringy Cable Anchor with Adjustable Screw Rod
Product:SH02



D	L_1	L_2	d	Unilateral regulating variable
Φ20	460	185	60	±70
Φ22	480	195	65	±70
Φ24	510	210	70	±70
Φ26	560	230	75	±80
Φ28	586	243	80	±80
Φ30	608	254	90	±80
Φ32	650	270	95	±90
Φ36	694	292	100	±90
Φ40	750	320	115	±90
Φ44	850	360	125	±110
Φ48	890	380	135	±110
Φ50	910	390	145	±110
Φ55	960	415	150	±110
Φ60	1020	445	165	±110
Φ65	1130	490	180	±130
Φ70	1200	520	195	±130
Φ75	1250	545	205	±130
Φ80	1300	570	220	±130
Φ85	1360	600	230	±130
Φ90	1420	630	250	±130
Φ95	1520	670	260	±140
Φ100	1570	695	275	±140
Φ105	1630	725	290	±140
Φ110	1690	755	310	±140
Φ115	1770	785	315	±150
Φ120	1820	810	325	±150
Φ125	1880	840	340	±150
Φ130	1940	870	350	±150
Φ135	1990	895	365	±150
Φ140	2050	925	380	±150

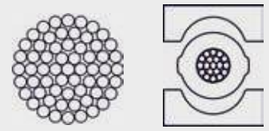
Adjustable Anchor with Fork Head
Product:YT01

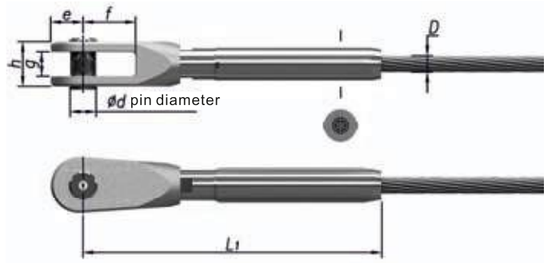




D	L_1	L_2	d	g	h	e	f	Unilateral regulating variable
Φ12	530	200	19.5	18	35	26	40	±60
Φ14	585	220	22.5	20	40	28	45	±65
Φ16	655	240	27.5	24	46	33	55	±70
Φ18	695	250	29.5	26	50	35	60	±70
Φ20	775	280	31.5	30	58	39	65	±75
Φ22	820	290	34.5	32	62	43	70	±80
Φ24	905	315	41.5	34	66	49	85	±85
Φ26	965	335	44.5	36	70	53	90	±90
Φ28	1020	355	47.5	38	72	58	95	±95
Φ30	1085	375	52.5	42	78	60	105	±100

Fixed Anchor with Fork Head
Product:YD01

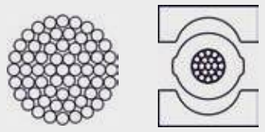


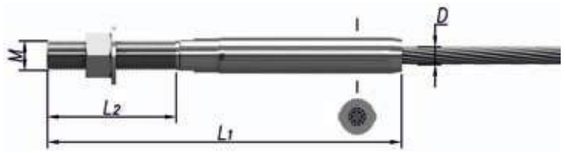


D	L_1	d	g	h	e	f
Φ12	225	19.5	18	35	26	40
Φ14	255	22.5	20	40	28	45
Φ16	295	27.5	24	46	33	55
Φ18	325	29.5	26	50	35	60
Φ20	355	31.5	30	58	39	65
Φ22	385	34.5	32	62	43	70
Φ24	435	41.5	34	66	49	85
Φ26	465	44.5	36	70	53	90
Φ28	495	47.5	38	72	58	95
Φ30	530	52.5	42	78	60	105

Adjustable Screw Anchor

Product:YL02

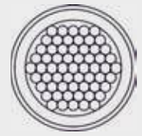


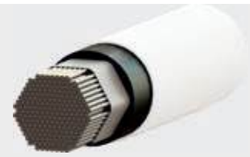


D	L_1	L_2	M
Φ12	255	105	M24×3
Φ14	285	115	M27×3
Φ16	320	125	M30×3.5
Φ18	345	130	M33×3.5
Φ20	380	145	M36×4
Φ22	410	155	M39×4
Φ24	450	165	M45×4.5
Φ26	480	175	M48×5
Φ28	510	185	M52×5
Φ30	540	195	M52×5

Adjustable Screw Anchor Parameter of Hot Extuded

The nominal strength of steel wire is 1670 MPa,
and the modulus of elasticity is more than 1.90×10^5 N/mm



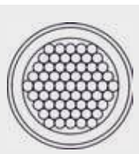


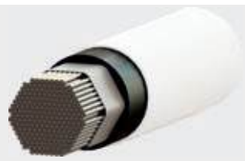
specification	cable diameter (mm)	external cable diameter (mm)	cable weight(kg/m) (kg/m)	Effective Section Area of Wire strand (mm^2)	Minimum breaking load (kN)
Φ5×19	25	40	3.7	373	623
Φ5×31	32	45	5.6	609	1017
Φ5×37	35	50	6.8	726	1213
Φ5×55	41	55	9.5	1080	1803
Φ5×61	45	59	10.7	1198	2000
Φ5×73	49	63	12.6	1433	2394
Φ5×85	51	65	14.4	1669	2787
Φ5×91	55	69	15.7	1787	2984
Φ5×109	58	72	18.3	2140	3574
Φ5×121	61	75	20.3	2376	3968
Φ5×127	65	79	21.6	2494	4164
Φ5×139	66	82	23.3	2729	4558
Φ5×151	68	83	25.1	2965	4951
Φ5×163	71	88	27.5	3200	5345
Φ5×187	75	92	31.0	3672	6132
Φ5×199	77	94	33.0	3907	6525
Φ5×211	81	98	35.2	4143	6919
Φ5×223	83	100	36.9	4379	7312
Φ5×241	85	102	39.7	4732	7902
Φ5×253	87	106	42.0	4968	8296
Φ5×265	90	110	44.2	5203	8689
Φ5×283	92	112	46.7	5557	9280
Φ5×301	95	116	49.8	5910	9870
Φ5×313	97	118	51.9	6146	10263
Φ5×337	100	122	55.5	6617	11050
Φ5×349	101	123	57.4	6853	11444
Φ5×367	105	126	60.4	7206	12034
Φ5×379	107	128	62.5	7442	12428
Φ5×409	110	133	67.2	8031	13411
Φ5×421	111	134	69.1	8266	13805
Φ5×439	115	138	72.4	8620	14395
Φ5×451	116	140	74.6	8855	14788
Φ5×475	119	142	77.9	9327	15575
Φ5×499	120	148	82.5	9798	16362
Φ5×511	123	152	85.2	10033	16756

Note:
1.The static breaking load of cable is more than 95% of the minimum breaking force.
2. The thickness of PE can be recommended and other thickness can be provided as required.
3. Other steel wire diameter or strength can be provided as required.

Hot extruded polyethylene cable
Parameter of hot extuded

The nominal strength of steel wire is 1670 MPa,and
the modulus of elasticity is more than 1.90×10^5 N/mm





specification	cable diameter (mm)	external cable diameter (mm)	cable weight(kg/m) (kg/m)	Effective Section Area of Wire strand (mm^2)	Minimum breaking load (kN)
Φ7×19	35	50	6.8	731	1221
Φ7×31	44	60	10.7	1193	1992
Φ7×37	49	65	12.8	1424	2378
Φ7×55	58	72	18.1	2117	3535
Φ7×61	63	77	20.3	2348	3920
Φ7×73	68	82	23.9	2809	4692
Φ7×85	71	87	27.7	3271	5463
Φ7×91	77	93	30.2	3502	5848
Φ7×109	81	97	35.3	4195	7005
Φ7×121	85	103	39.4	4657	7777
Φ7×127	91	109	41.9	4888	8162
Φ7×139	92	111	44.9	5349	8933
Φ7×151	94	113	48.6	5811	9705
Φ7×163	99	118	52.7	6273	10476
Φ7×187	105	125	59.9	7197	12018
Φ7×199	108	128	63.8	7658	12790
Φ7×211	113	133	68.1	8120	13561
Φ7×223	116	137	71.6	8582	14332
Φ7×241	119	139	76.8	9275	15489
Φ7×253	122	143	81.0	9737	16260
Φ7×265	127	148	85.4	10198	17031
Φ7×283	129	151	90.3	10891	18188
Φ7×301	133	155	96.0	11584	19345
Φ7×313	135	158	100.0	12046	20116
Φ7×337	141	163	107.2	12969	21659
Φ7×349	142	166	111.1	13431	22430
Φ7×367	147	171	117.2	14123	23587
Φ7×379	149	174	121.3	14586	24358
Φ7×409	154	180	130.2	15740	26286
Φ7×421	155	181	133.8	16202	27057
Φ7×439	161	187	140.3	16895	28214
Φ7×451	163	189	144.2	17357	28985
Φ7×475	166	194	151.5	18280	30528
Φ7×499	168	202	160.3	19204	32070
Φ7×511	172	206	164.9	19666	32841

Note:
1.The static breaking load of cable is more than 95% of the minimum breaking force.
2. The thickness of PE can be recommended and other thickness can be provided as required.
3. Other steel wire diameter or strength can be provided as required.

Adjustable Anchor with Fork Head
Product:PT01

meet EN1993-1-8 requirement

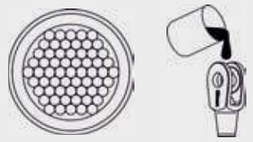
specification	L_1	d	g	h	e	k	f	Unilateral regulating variable
Φ5×19	580	49	44	90	80	125	100	±80
Φ5×31	690	65	55	115	104	162	130	±90
Φ5×37	745	73	65	135	115	182	145	±90
Φ5×55	880	88	75	155	140	215	170	±110
Φ5×61	880	88	75	155	140	215	170	±110
Φ5×73	950	102	90	180	165	250	195	±110
Φ5×85	950	102	90	180	165	250	195	±110
Φ5×91	1005	107	95	190	175	270	210	±110
Φ5×109	1120	117	105	210	185	290	230	±130
Φ5×121	1185	126	110	220	205	315	245	±130
Φ5×127	1185	126	110	220	205	315	245	±130
Φ5×139	1230	136	115	235	220	340	260	±130
Φ5×151	1230	136	115	235	220	340	260	±130
Φ5×163	1285	145	125	250	235	365	280	±130
Φ5×187	1340	155	130	265	250	385	295	±130
Φ5×199	1340	155	130	265	250	385	295	±130
Φ5×211	1400	166	140	285	265	410	315	±130
Φ5×223	1400	166	140	285	265	410	315	±130
Φ5×241	1495	174	145	295	275	430	330	±140
Φ5×253	1550	182	155	310	295	455	350	±140
Φ5×265	1550	182	155	310	295	455	350	±140
Φ5×283	1600	186	160	320	300	475	360	±140
Φ5×301	1660	196	170	340	315	500	380	±140
Φ5×313	1660	196	170	340	315	500	380	±140
Φ5×337	1735	206	175	350	330	520	395	±150
Φ5×349	1735	206	175	350	330	520	395	±150
Φ5×367	1790	215	190	370	345	540	415	±150
Φ5×379	1790	215	190	370	345	540	415	±150
Φ5×409	1840	222	195	385	355	560	425	±150
Φ5×421	1895	228	200	395	370	575	440	±150
Φ5×439	1895	228	200	395	370	575	440	±150
Φ5×451	1945	236	205	405	385	600	455	±150
Φ5×475	1945	236	205	405	385	600	455	±150
Φ5×499	2005	245	210	420	395	620	475	±150
Φ5×511	2005	245	210	420	395	620	475	±150

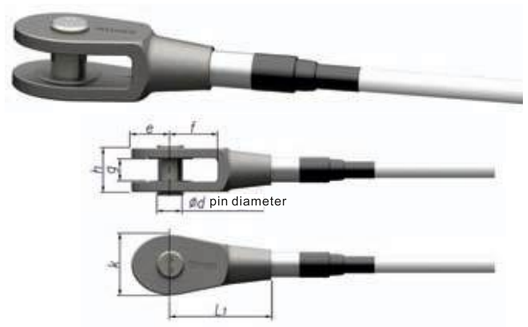
Note:
1.The dimension of φ7 Series anchorage is replaced by the dimension of φ5 series anchorage according to the minimum breaking force of steel wire bundle.
2.Other opening sizes and adjustments can be provided as required.

Fixed Anchor with Double-ear

meet EN1993-1-8 requirement

Product:PD01





D	L_1	d	g	h	e	k	f
Φ5×19	210	49	44	90	80	125	100
Φ5×31	270	65	55	115	104	162	130
Φ5×37	300	73	65	135	115	182	145
Φ5×55	355	88	75	155	140	215	170
Φ5×61	355	88	75	155	140	215	170
Φ5×73	405	102	90	180	165	250	195
Φ5×85	405	102	90	180	165	250	195
Φ5×91	435	107	95	190	175	270	210
Φ5×109	475	117	105	210	185	290	230
Φ5×121	510	126	110	220	205	315	245
Φ5×127	510	126	110	220	205	315	245
Φ5×139	545	136	115	235	220	340	260
Φ5×151	545	136	115	235	220	340	260
Φ5×163	585	145	125	250	235	365	280
Φ5×187	615	155	130	265	250	385	295
Φ5×199	615	155	130	265	250	385	295
Φ5×211	655	166	140	285	265	410	315
Φ5×223	655	166	140	285	265	410	315
Φ5×241	690	174	145	295	275	430	330
Φ5×253	725	182	155	310	295	455	350
Φ5×265	725	182	155	310	295	455	350
Φ5×283	755	186	160	320	300	475	360
Φ5×301	795	196	170	340	315	500	380
Φ5×313	795	196	170	340	315	500	380
Φ5×337	830	206	175	350	330	520	395
Φ5×349	830	206	175	350	330	520	395
Φ5×367	865	215	190	370	345	540	415
Φ5×379	865	215	190	370	345	540	415
Φ5×409	895	222	195	385	355	560	425
Φ5×421	930	228	200	395	370	575	440
Φ5×439	930	228	200	395	370	575	440
Φ5×451	960	236	205	405	385	600	455
Φ5×475	960	236	205	405	385	600	455
Φ5×499	1000	245	210	420	395	620	475
Φ5×511	1000	245	210	420	395	620	475

Note:
1.The dimension of φ7 Series anchorage is replaced by the dimension of φ5 series anchorage according to the minimum breaking force of steel wire bundle.
2.Other opening sizes and adjustments can be provided as required.

Adjustable Anchor with Fork Head

It meets the strength check requirements and structural requirements of GB50017 " Standards for Design of Steel Structures".

Product:PT02

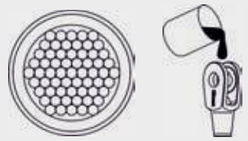
规格	L_1	d	g	h	e	k	f	Unilateral regulating variable
Φ5×19	620	49	44	90	105	170	140	±80
Φ5×31	725	65	55	115	130	215	165	±90
Φ5×37	775	73	65	135	145	240	175	±90
Φ5×55	905	88	75	155	165	275	195	±110
Φ5×61	905	88	75	155	165	275	195	±110
Φ5×73	995	102	90	180	190	305	240	±110
Φ5×85	995	102	90	180	190	305	240	±110
Φ5×91	1055	107	95	190	195	325	260	±110
Φ5×109	1170	117	105	210	215	355	280	±130
Φ5×121	1235	126	110	220	225	370	295	±130
Φ5×127	1235	126	110	220	225	370	295	±130
Φ5×139	1285	136	115	235	240	400	315	±130
Φ5×151	1285	136	115	235	240	400	315	±130
Φ5×163	1325	145	125	250	255	415	320	±130
Φ5×187	1385	155	130	265	270	445	340	±130
Φ5×199	1385	155	130	265	270	445	340	±130
Φ5×211	1460	166	140	285	290	480	375	±130
Φ5×223	1460	166	140	285	290	480	375	±130
Φ5×241	1560	174	145	295	305	500	395	±140
Φ5×253	1625	182	155	310	310	515	425	±140
Φ5×265	1625	182	155	310	310	515	425	±140
Φ5×283	1680	186	160	320	320	525	440	±140
Φ5×301	1750	196	170	340	335	555	470	±140
Φ5×313	1750	196	170	340	335	555	470	±140
Φ5×337	1830	206	175	350	350	575	490	±150
Φ5×349	1830	206	175	350	350	575	490	±150
Φ5×367	1915	215	190	370	360	590	540	±150
Φ5×379	1915	215	190	370	360	590	540	±150
Φ5×409	1970	222	195	385	375	620	555	±150
Φ5×421	2015	228	200	395	385	635	560	±150
Φ5×439	2015	228	200	395	385	635	560	±150
Φ5×451	2050	236	205	405	395	655	560	±150
Φ5×475	2050	236	205	405	395	655	560	±150
Φ5×499	2110	245	210	420	415	680	580	±150
Φ5×511	2110	245	210	420	415	680	580	±150

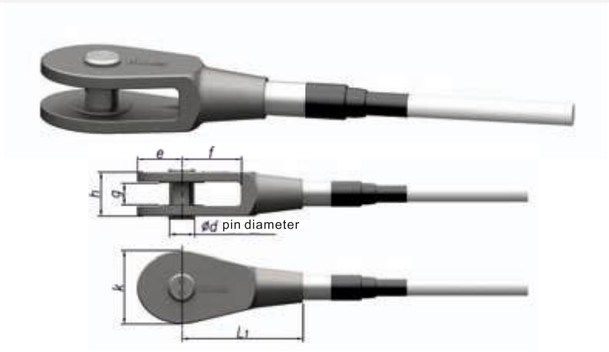
Note:
1.The dimension of φ7 Series anchorage is replaced by the dimension of φ5 series anchorage according to the minimum?breaking force of steel wire bundle.
2.Other opening sizes and adjustments can be provided as required.

Fixed Anchor with Fork Head

Product:PD02

It meets the strength check requirements and structural requirements of GB50017 " Standardsfor Design of Steel Structures".





D	L_1	d	g	h	e	k	f
Φ5×19	250	49	44	90	105	170	140
Φ5×31	305	65	55	115	130	215	165
Φ5×37	330	73	65	135	145	240	175
Φ5×55	380	88	75	155	165	275	195
Φ5×61	380	88	75	155	165	275	195
Φ5×73	450	102	90	180	190	305	240
Φ5×85	450	102	90	180	190	305	240
Φ5×91	485	107	95	190	195	325	260
Φ5×109	525	117	105	210	215	355	280
Φ5×121	560	126	110	220	225	370	295
Φ5×127	560	126	110	220	225	370	295
Φ5×139	600	136	115	235	240	400	315
Φ5×151	600	136	115	235	240	400	315
Φ5×163	625	145	125	250	255	415	320
Φ5×187	660	155	130	265	270	445	340
Φ5×199	660	155	130	265	270	445	340
Φ5×211	715	166	140	285	290	480	375
Φ5×223	715	166	140	285	290	480	375
Φ5×241	755	174	145	295	305	500	395
Φ5×253	800	182	155	310	310	515	425
Φ5×265	800	182	155	310	310	515	425
Φ5×283	835	186	160	320	320	525	440
Φ5×301	885	196	170	340	335	555	470
Φ5×313	885	196	170	340	335	555	470
Φ5×337	925	206	175	350	350	575	490
Φ5×349	925	206	175	350	350	575	490
Φ5×367	990	215	190	370	360	590	540
Φ5×379	990	215	190	370	360	590	540
Φ5×409	1025	222	195	385	375	620	555
Φ5×421	1050	228	200	395	385	635	560
Φ5×439	1050	228	200	395	385	635	560
Φ5×451	1065	236	205	405	395	655	560
Φ5×475	1065	236	205	405	395	655	560
Φ5×499	1105	245	210	420	415	680	580
Φ5×511	1105	245	210	420	415	680	580

Note:
1.The dimension of φ7 Series anchorage is replaced by the dimension of φ5 series anchorage according to the minimum?breaking force of steel wire bundle.
2.Other opening sizes and adjustments can be provided as required.

Fiber Bragg Grating Smart Cable

The Smart Strand Cable Scientific and Technological Achievement Evaluation Meeting was held on December 19, 2020.

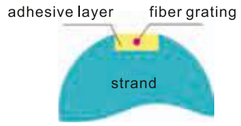
The expert group has evaluated on the report of research and development,output the achivements as belows:

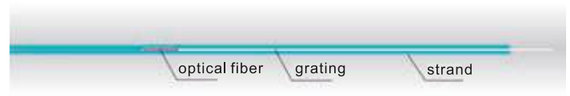
1. Developed fiber smart steel strand cables for building structures, which solved the key technical problems of cable testing.
2. Developed fiber smart bars for building structures, and solved the technical problems of fiber smart steel strand cable twisting by adopting intelligent circular twisting equipment and forward and reverse helical twisting.
3. The application of high temperature protection technology solves the key problem in the production.
4. The relationship between the stress and strain of the fiber smart cable is established, and the intelligent real-time and full-scale accurate measurement of the cable force is realized, and the high-precision health detection/monitoring method of cable force is provided.
5. The development of hot-cast fiber grating smart steel stranded cable for building structure solves the key technical problems of building cable structure detection/monitoring, has good economic and social benefits, and has broad application prospects.

Finally, the expert group believes that the results have reached the international advanced level in general, and the technical achievements of the hot-cast anchors of the fiber smart steel strand cable have achieved the international leading level.

Fiber Bragg Grating Smart Cable

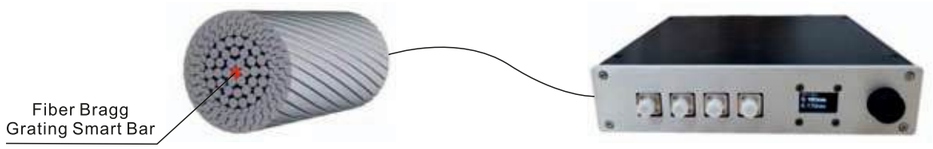
The fiber grating smart bar is installed in the cable to form a smart cable, and the long-term force monitoring of the cable is realized through the strain measurement of the smart bar.





Fiber Bragg Grating Smart Cable

The fiber grating smart bar is installed in the cable to form a smart cable, and the long-term force monitoring of the cable is realized through the strain measurement of the smart bar.。

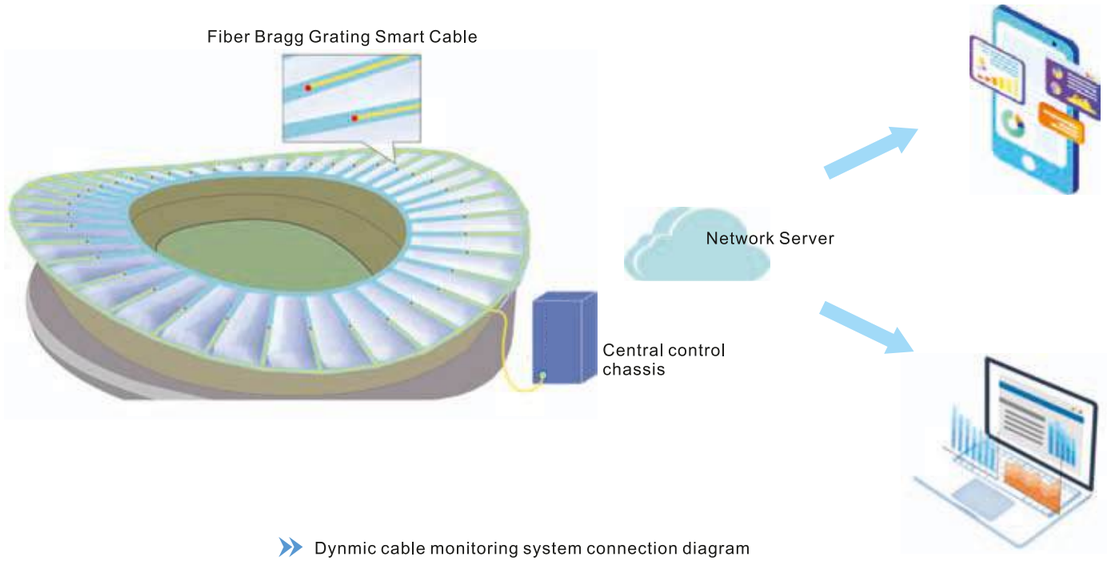


Fiber Bragg Grating Smart Cable　　Collector

Online detection system

Smart Cable Perception and Collection of Changed Signals → Acquisition and transmission module identification and conversion signal processing transmission data → Data processing and management module analysis and processing data storage management data → Monitoring platform diagnosis, evaluation, security warning, etc.

Smart Cable Monitoring System Technical Route



Dynmic cable monitoring system connection diagram

Measurement principle

The fiber grating realizes the strain measurement of the steel strand through the strain transmission of the intermediate medium such as the binder. The relationship between the real strain of the steel strand of the base structure and the monitoring strain of the FBG satisfies:

$$\varepsilon_m = \frac{1}{\beta} \times \varepsilon_g = \beta \times \frac{\Delta\lambda}{k_{FBG}}$$

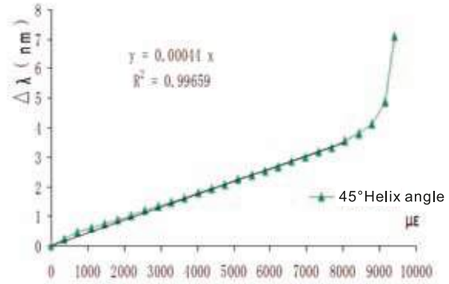
In the formula: ε is the actual strain of the steel strand, ε is the monitoring strain of the FBG, β is the strain transfer correction coefficient,Δλ is the change value of the wavelength, and κ is the strain sensitivity of the fiber grating.

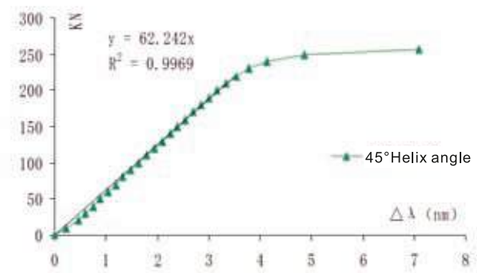
Calibration relationship

The fiber grating sensing performance of the smart steel strand is calibrated according to the static tension, and the linear fitting curve is obtained according to the formula of force (F)-wavelength (λ) calibration data. The measured original data is the wavelength, which is substituted into the simulation Combines the curves to get the force value.。

$$F = k_f \cdot \Delta\lambda = k_f \cdot (\lambda_i - \lambda_0)$$

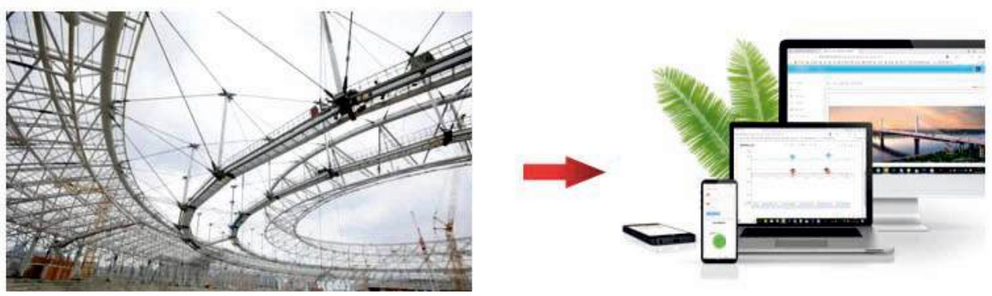
In the formula: F is the force on the steel strand monitored by the fiber grating, k is the calibration force sensitivity of the fiber grating, Aλ is the change value of the wavelength of the fiber grating, λ is the monitoring wavelength of the fiber grating, input. is the initial wavelength of the fiber grating



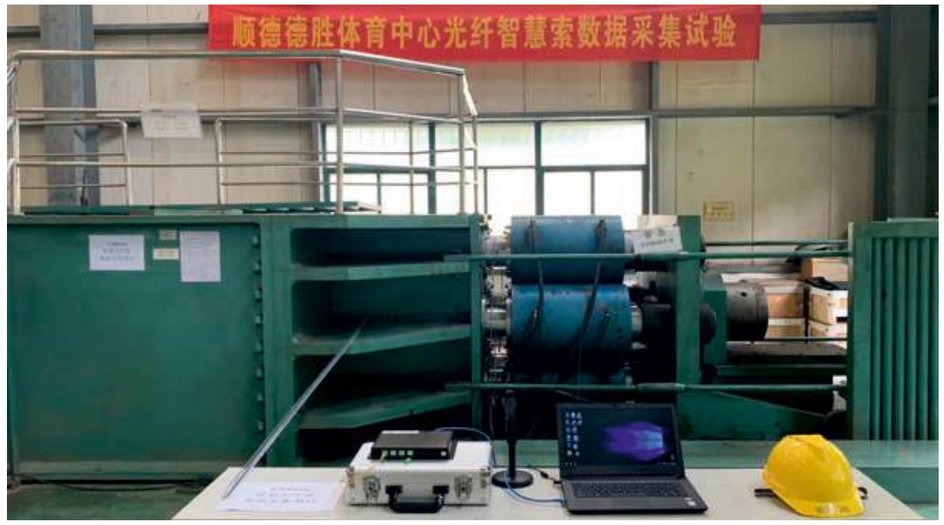


Monitoring platform functions

- Real-time cable force display function
- Comparison of historical cable force, actual cable force and design cable force
- Security warning
- Sensor anomaly detection
- Stable development trend forecast



Test site



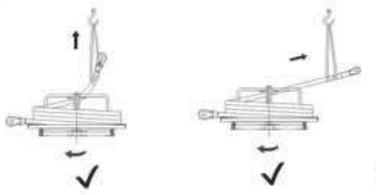
Cable Ordering Instructions

1. When the customer orders the cable, please provide the length value of the cable L (the distance from the center to center of pin according to the actual situation of the project. Whether the L length is the length in the stress state or the length in the zero stress state, please indicate it clearly when placing an order, and provide the prestress value of the cable construction tension.
2. Please consider the influence of temperature on the length of the cable according to the actual needs of the project. When measuring the length of the cable, the temperature of our company is controlled at 10℃-25℃.
3. The surface treatment of the cable anchorage includes epoxy zinc-rich primer, fluorocarbon spraying, etc. Considering that the cable will do overall anti-corrosion and surface appearance with the steel structure after installation and debugging in the engineering structure, it is recommended that customers choose epoxy rich For the surface treatment method of zinc primer, if fluorocarbon spraying is used, please provide the corresponding color card.

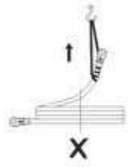
Instructions for Application

1. When packaging and transporting in a loop, the anchors at both ends of the cable should be fixed.
2. After the cable is transported to the construction site, the place where the cable is placed should be cleaned up, and then the cable should be taken out horizontally and placed on the backing plate. The cable with the cable reel is taken out together with the cable reel. If the cable is transported to the construction site but not used temporarily, protective measures should be taken in time, and it should be stored in a dry, clean and ventilated warehouse.

3. When laying out the cable at the construction site, the cable should be placed on the cable reel, and then the cable reel should be rotated and opened in the opposite direction of the cable reel. It is forbidden to directly hang the cable vertically when the cable is not opened. When hoisting, the anchors at both ends should take corresponding protective measures to prevent scratches and collisions.

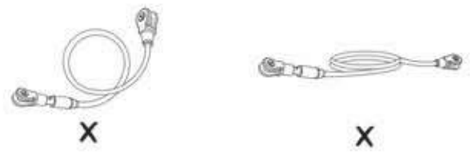


First open the outer packaging of the cable and then lift it upwards

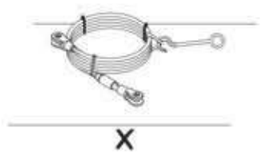


It is not allowed to hang the cable directly vertically

4. In order to prevent the cable body appears the loose strand and causing the wire skipping, the knotted state is forbidden. Meanwhile the tension cables can not be drageed on the land surface without any protection and be placed arbitrarily.



Do not make the cable knotted



No dragging on the ground

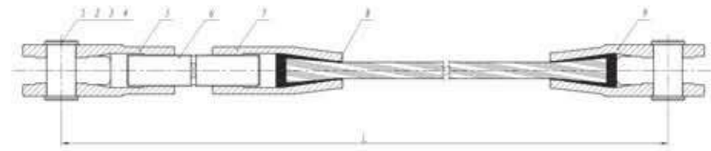
5.In order to protect the cable body from scraching, it needs to avoid friction and bumping with hard material. When the anchors appeared deformation, twisting,scratching,the cable body had skipping,knotted, scratching and bump,please contact the professional people to check, repair or discard.

6.The producing surface treatment of cable anchor is thermal spraying zinc with zinc-rich epoxy primer, which is the basic anti-corrosion treatment. There should be the integral anticorrosion treatment after the stretching of installation.

7. The surface of the cable is easily scratched on the construction site,we have two methods to figure it out:
(1).Cleaning the scratched surface first, then painting the CRC cold galvanizing lacquer.
(2).Cleaning the scratched surface first , then spraying the zinc-rich epoxy primer no less than 10Oμm.

8.When packaging,for the tension cable with diameter Y80mm, there will be an iron wire ring on the cable body every 2 meters.After arriving on the construction site, please do not release the rings before the stretching installation,so that can prevent the uppermost level wires of the cable body from skipping when lifting.

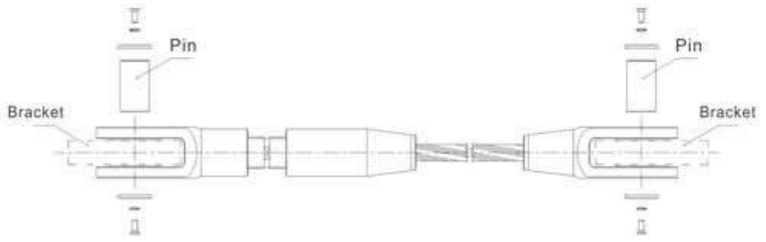
9.It's prohibit to use the cable as welding wire on the construction site,as it may cause the breaking of uppermost level cables.



1.Pin 2.Pin Cover Plate 3.Locking Washer 4.Bolt 5.Adjusting Head Anchor
6.Screw 7.Adjusting Rotor Anchor 8.Thimbles 9. Fixed Head Anchor

Installation Instructions of the Tension Cable

1. Please check the integrity and complete of the length, label,specifications, model,quantity and the related accessories of the tension cable. If there is any surface scratching or lacquer peeling, please mend or change it timely.
2. When installing, detaching the pin and pin cover plate first, then putting the ear plate into the head anchor slot.After realizing the realignment between center holes of ear plate and head anchor, putting in the bolt and using the bolt to fix the pin and pin cover.



3. During the installation, please handle the tension cable and its accessories with attention essentially, and put them on the wooden plate or other base plate instead of putting on the ground directly.
4. When lifting, please make sure all of the accessories of the tension cable are connected correctly, and ensure the whole process is stable and safety, no bump and no heavy shaking.
5. It is suggested that do not release the packing belts of the tension cable, until it be lift-off the ground during the stretching process, which can prevent the tension cable coating layer from damaged.
6. During the installation, there may have the difficult of thread engagement, which may mainly caused by the thread deformation, having sand on the thread, thread rusted, positive-negative thread or inequality thread pitch. This situation can be solved by using the file finishing, cleaning or wiping the thread, using the steel brush cleaning the rust or change the component.
7. There should have professional staff and equipment during the process of stretching the cable and execution strictly accordance with the instruction. If there have any abnormal situation during the stretching process, the processing must be stopped immediately and check the reason. Just after the problem is solved then it can be continue.

8 The press should be forcing after the anchors of both side of the cable are proper connected with the connection piece,The two adjusting anchors should be adjust after the proper connect, and the pre-stress should reach the install require after adjusting.

9. It also needs to conduct a comprehensive inspection after the installation,to check whether the components missing, damage, loosening, etc. and check whether the loading of the cable meet the design.

Notes

1.The lifting process of the tension cable should be properly,please make sure the softly lift, put down and unload.
2. Please pay attention to fire prevention, waterproof and anti-corrosion of the cable.
3.The cable should avoid the excessive bending angle so as not to appear the wire skipping and the body loosening.
4.The cable should avoid collision, friction,strike, and avoid the threaded connection part colliding with other things and be stained with sundries.
5.It should avoid the welding process,cement and mortar to pollute the uncovered parts of tension cable on the construction site.or taking relevant protection methods if it can not be avoided.

Introduction of Steel Tension Rod

Steel tension rod is assembled with rod and connectors, and used in architectural structure to bear the axial tension force.KINEX steel tension rod is made of high quality alloy steel, and its overall properties can be enhanced through forging, heat treatment, etc. to achieve high wind-load resistance, good toughness, superior fatigue performance and durability, and easily transport and install. With the development of architecture industry, more and more architects prefer to use steel tension rod in architectural structure, such as stadium, airport, train station, bridge, seaport, etc. With continuous efforts we have developed tension rod systems for architecture and bridge, for shipbuilding yard and seaport, and for high strength anchoring.

Steel Tension Rod has two series: Non-equal strength Tension Rod Series & Equal-strength Tension Rod Series. There are five strength grades (235~650) ; High strength anchor bar series products have 850 grade (φ20~φ130) , 1100 grade (φ20~φ80) . Clients can select accordingly.

Architecture and bridge tension rod system

Shipbuilding yard and seaport tension rod system

High strength anchoring tension rod system

Compression strut

Products quality control

Corrosion resistance systems suitable for coating in workshop:

1.Epoxy zinc rich primer system: epoxy zinc rich primer coating or water-soluble inorganic zinc rich primer;
2.Electro galvanization corrosion resistance system:Electro galvanization;
3.Hot-dip galvanization corrosion resistance system: Hot-dip galvanization.

Corrosion resistance systems suitable for coating on site:

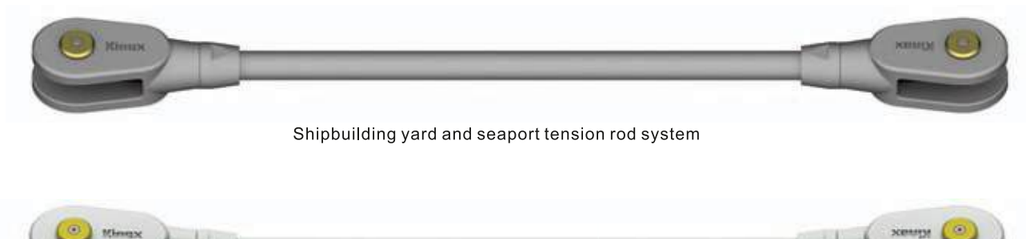
1.Fluoro carbon paint corrosion resistance system:Epoxy zinc rich primer + Epoxy MIO intermediate coat + Fluoro carbon top coat;
2.Polyurethane paint corrosion resistancesystem:Epoxy zinc rich primer + Epoxy MIO intermediate coat + Polyurethane top coat;
3.Fireproof coating:Epoxy zinc rich primer + Epoxy MIO intermediate coat + Super thin anti-fire coat for steel structure.

We recommend epoxy zinc rich primer(EZRP) system to our clients for below reasons:

1.EZRP can be easily matched up with top coating paint. It has good adhesiveness and physical characteristics. It is strong adhesive to top coating paint. It can dry up quickly in normal temperature. It doesn't interfere with color of top coating;
2.Areas of coating that are damaged or scratched during transportation can be re-coated very easilyJ;
3.The compatibility of EZRP is very high and thus it is easy to do corrosion resistance coating for steel tension rod and the whole steel structure.

Various Surface Treatment as following:

Epoxy zinc rich primer



Shipbuilding yard and seaport tension rod system

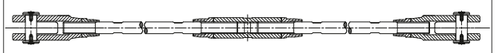
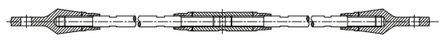
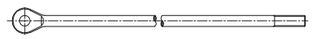
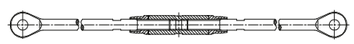
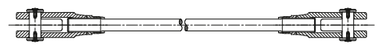
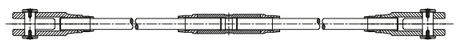
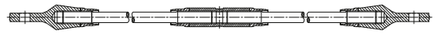
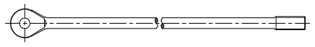
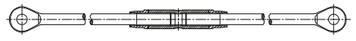
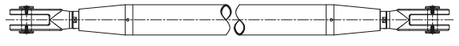
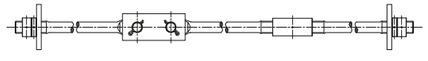
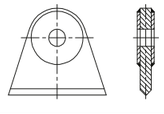
Fluorocarbon coating

Hot dip galvanized

Zinc-plated

Fireproof coating

Steel Tension Rod Classification

Type		Product code	Name	Form
Architecture and Bridge Tension Rod System	Non-equal Strength Tension Rod Series	LG04	Spiro Union & Fork End (tensionable)Tension Rod	
		LG04T	Spiro Union & Fork End (tensionable) Tension Rod(with couplers)	
		LG05	Spiro Union & Plate End (tensionable)Tension Rod	
		LG05T	Spiro Union & Fork End(tensionable) Tension Rod(with couplers)	
		LG06	Forged Fork End Tension Rod	
		LG06T	Forged Monaural Tension Rod (with couplers)	
		LJT03	Central Connector (Cwoupler)	
	Equal Strength Tension Rod Series	LG01	Spiro Union& Fork End (tensionable) Tension Rod	
		LG01T	Spiro Union & Fork End (tensionable) Tension Rod(with couplers)	
		LG02	Spiro Union & Plate Style (tensionable) Tension Rod	
		LG02T	SpiroUnion & Plate End (tensionable) Tension Rod(with couplers)	
		LG03	Forged Plate End Tension Rod	
		LG03T	Forged Plate End Tension Rod (with couplers)	
	Steel Strut Series	YG01	Compression Strut	
	Membrance Structure Series	MLG01	Membrance Structure Tension Rod	
Shipbuilding Yard and Seaport Tension Rod System		CLG	Shipbuilding Yard and Seaport Tension Rod	
Anchor Series		MG01	High Strength Anchoring Tension Rod	
Ear Plate Series		EB	Ear Plate (Bracket)	

There are various of combination forms of steel tension rods, above are just common combination forms.
The architects can design combination freely according to actual project condition.。

Specification for Ordering

Illustration for Standard Fittings

A standard KINEX steel tension rod consists of fork end,eye end, pin set,locking nut, connector,and coupler.
The structure and function of each part as below.

Fork Eand Anchor

The structure of double-ear anchor is as shown on the left.Working with pin set and ear bracket, it transfers the load from tension rod to main structure. In this structure, the tension rod can rotatearound the pin. The anchor and tension rod are connected by thread,and the length of the tension rod can be adjusted by adjusting the threading length.Double-ear anchor is the most commonly used structure in projects. The pin set will be supplied by us.

Single Plate Anchor

The structure of Single-ear anchor is as shown on the left. Working with pin set and ear bracket, it transfers the load from tension rod to main structure and it can be connected to double-ear anchor. In this structure, the tension rod can rotate around the pin. The anchor and tension rod are connected by thread, and the length of the tension rod can be adjusted by adjusting the threading length, Sinale-ear anchor is the less commonly used structure in projects. The pin set is normally supplied according to the clevis bracket on the main structure.

Single Plate Anchor

Pin set consists of pin,pin cover, lock washer, and screw.In practice, the fit clearance between connection plate and fork end on one side is in a range of 1to 3mm,recommended values of fit clearance between pin hole is in a range of 0.5to 1.5mm To ensure the accuracy of fit between pin and forkeye as well as the requirement of corrosion resistance, colored galvanization is applied to finish of our pin and pin cover.

Colored Galvanized Pin

Pin Set

Locking nut is conical. Its main function is to lock the fork end and tension rod, preventing loose.Acer tain length of nut is reserved to conceal the thread of rod.

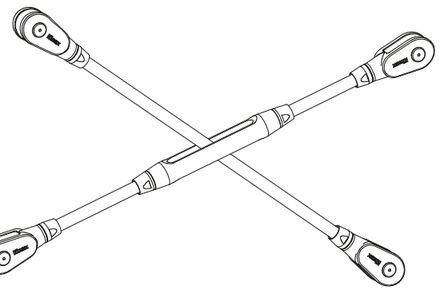
The end of the nut is smoothly connected to the end of fork to maintain.

Adjusting Sleeve

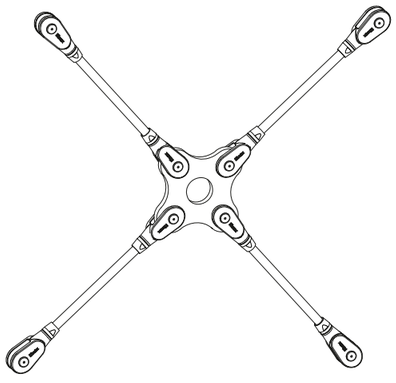
Adjusting sleeve is a threaded pipe connector and is used to extend the length of tension rod. It can be used anywhere in the middle of tension rod. The adjuster itself also is adjustable and can improve the adjustability of tension rod to offset the structure deviation and requirement of tensioning.

Hollow Spindle-shaped Adjusting Sleeve

Hollow spindle-shaped adjusting sleeve is a hollow spindle-shaped connector. It has the same function as connector to adjust and extend the length of tension rod. It can make two tension rods across in the same plane without interfering because of its hollow spindle-shaped structure. It can be used for unequal strength series tension rod with diameter ranging from φ16mm to φ50mm.It is recommended to use the board type adapter for the unequal strength type greater than φ50 and all the equal strength types. The specific form is shown in the figure below



Application Ilustration of Hollow Spindle-shaped Adjusting Sleeve



Application Illustration of Plate Connecting

Basic Information for Ordering Standard Fittings

1. Please provide steel tension rod specification,such as strength grade,length(pin to pin),quantity and surface finish when ordering products;

2. Clients can provide the design load value and length of the tension rods, and re-confirm after KINEX technician choose the model;

3.Steel tension rod model code: non-uniform strength tension rod series LG04,LG05,LG06,uniform strength tension rod series LG01, LG02, LG03, Specific code as below;

a.If client order non-equal strength tension rod with fork end without connector ,
strength grade is A , diameter is 40mm , the code is LG04A-40;

b. If client order equal strength tension rod with eye endand connector,strength grade is A, diameter is §60mm,the code is LG02TB-60;

4. If nonstandard tension rod is needed,please contact KINEX Technical Department.

Smart Steel Tension Rod

The tenion rod has the advantages of high strength, good toughness, economical and practical, and has been widely used in straight -tensile unit of the pre-stressed steel structure. Whether the initial pre-tension to the steel rod meets with the design requirements will directly effects the loading capacity and the safety property of the pre-stressed structures. Therefore, the detection and monitoring of the internal force has become an important part of the construction stage. The dynamometer method of steel rod normally adopt torque coefficient method or hydraulic conversion method, but the measurement results will be effected by many factors and the comprehensive error is very big,so it can hardly meet the construction requirements of modern pre-stressed steel structure,Therefore, KINEX and some well-known domestic universities invent the smart steel rod with high-precision sensor in the accessories. Through calibrating the sensor, the smart steel rod has the property of load cell.

The Related Measuring Equipment of the Smart Steel Tension Rod:

Smart steel tension rod includes a rod bar and accessories,signal-collecting device,signal-receiving device(desktop computer, laptop, netbook, tablet personal computer, PAD, intelligent MP4),dynamometric software and data wrie.

Handheld Tensometer

Wireless Communication Devices

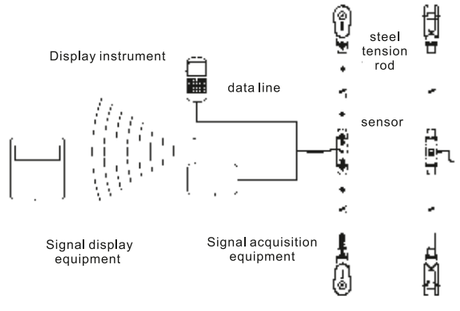
Site dynamometric testing has two methods:

1.Use of handheld tensometer, insert the interface of the sensor directly into the interface of the tensometer, the prestress value will be displayed on the tensometer. It has the advantages of high accuracy, simple operation, and easy carrying.

2. Use of wireless communication devices,insert the interface of the sensor into the signal acquisition box, prestressed value will be displayed directly on the wireless communication devices (desktop, laptop, nettop, tablet security, multi-point acquisition, centralized testing.

Working Principle:

The working principle of the smart steel tension rod system is assembly of steel rod connecting sleeve with the high precision sensor (hereinafter referred as intelligent connecting sleeve), through the sensor calibration, enables it to achieve the measurement of tension performance. When the prestress is applied on the stee ltension rod,connecting signal acquisition device and the intelligent data wire.The sensor of the intelligent connection sleeve will occur in strain and through data line the strain signal transduction to display instrument or the signal acquisition device.



Schematic Diagram of Working Principle

Products quality control

The Dynamometric Progress of Smart Steel Rod

①Put high-precision sensor in the steel rod accessories→②Calibrate tensometer→③install the steel rod→④Site dynamometric testing①②Are implemented in the factory, ③④Are implemented on the construction site.

The accuracy can reach more than 95% after repeated testing. The inventation of smart steel tie rod solves the problem of detection and monitoring of the steel rod pre-tension, and can basically meet the requirements of modern steel construction.

Projects

Project Name:Wuxi Yingte IKEA Shopping Center

Tension Rod Strength Grade:345 Grade
Tension Rod Specification:φ20，φ40，φ50，φ85

I.Steel Tension Rod Strength Grade

Steel Tension Rod

Strength Grade	Strength Grade Code	Diameter Φ (mm)	Yield Strength $R_{P0.2}$(N/mm²)	Tensile Strength R_m(N/mm²)	Elongation
			⩾		
235	A	16~250	235	375	22
345	B	16~250	345	470	22
460	C	16~250	460	610	20
550	D	16~250	550	750	18
650	E	16~250	650	850	15

High-strength Rolled Plain Anchor Bar

Strength Grade	Diameter Φ (mm)	Yield Strength $R_{P0.2}$(N/mm²)	Tensile Strength R_m(N/mm²)	Elongation A(%)
		⩾		
850	20~130	850	1050	10
1100	20~80	1100	1230	8

II.Mechanical Property of Steel Tension Rod

Mechanical Properties of High-strength Rolled Plain Anchor Bar

Rod Diameter Φ (mm)	Rod Effective Sectional Area (mm²)	Theoretical Load (kN) ⩾			
		850grade		1100grade	
		yield load	break load	yield load	break load
20	314	266	329	345	386
25	490	416	514	539	602
30	706	600	741	776	868
35	962	817	1010	1058	1183
40	1256	1067	1318	1381	1544
45	1590	1351	1669	1749	1955
50	1963	1668	2061	2159	2414
55	2375	2018	2493	2612	2921
60	2827	2402	2968	3109	3477
65	3318	2820	3483	3649	4081
70	3848	3270	4040	4232	4733
75	4417	3754	4637	4858	5432

Diameter Φ (mm)	Rod Effective Sectional (mm²)	Theoretical Load (kN) ⩾			
		850grade		1100grade	
		yield load	break load	yield load	break load
80	5026	4272	5277	5528	6181
85	5674	4822	5957	--	--
90	6361	5406	6679	--	--
95	7088	6024	7442	--	--
100	7853	6675	8245	--	--
105	8659	7360	9091	--	--
110	9503	8077	9978	--	--
115	10386	8828	10905	--	--
120	11309	9612	11874	--	--
125	12271	10430	12884	--	--
130	13273	11282	13936	--	--

Non-equal Strength Steel Tension Rod Mechanical Property

minal Diameter Φ (mm)	Rod Effective Sectional Area (mm^2)	Theoretical Load (kN) ≥									
		A(235)		B(345)		C(460)		D(550)		E(650)	
		yield load	break load	yield load	break load	yield load	break load	yield load	break load	yield load	break load
16	156	36	58	53	73	71	95	85	117	101	132
20	244	57	91	84	114	112	148	134	183	158	207
25	386	90	144	133	181	177	235	212	289	250	328
30	560	131	210	193	263	257	341	308	420	364	476
35	766	180	287	264	360	352	467	421	574	497	651
40	1031	242	386	355	484	474	628	567	773	670	876
45	1306	306	489	450	613	600	796	718	979	848	1110
50	1612	378	604	556	757	741	983	886	1209	1047	1370
55	1950	458	731	672	916	897	1189	1072	1462	1267	1657
60	2362	555	885	814	1110	1086	1440	1299	1771	1535	2007
65	2768	650	1038	954	1300	1273	1688	1522	2076	1799	2352
70	3254	764	1220	1122	1529	1496	1984	1789	2440	2115	2765
75	3779	888	1417	1303	1776	1738	2305	2078	2834	2456	3212
80	4344	1020	1629	1498	2041	1998	2649	2389	3258	2823	3692
85	4947	1162	1855	1706	2325	2275	3017	2720	3710	3215	4204
90	5590	1313	2096	1928	2627	2571	3409	3074	4192	3633	4751
95	6273	1474	2352	2164	2948	2885	3826	3450	4704	4077	5332
100	6994	1643	2622	2412	3287	3217	4266	3846	5245	4546	5944
105	7755	1822	2908	2675	3644	3567	4730	4265	5816	5040	6591
110	8555	2010	3208	2951	4020	3935	5218	4705	6416	5560	7271
115	8886	2088	3332	3065	4176	4087	5420	4887	6664	5775	7553
120	9917	2330	3718	3421	4660	4561	6049	5454	7437	6446	8429
125	10386	2440	3894	3583	4881	4777	6335	5712	7789	6750	8828
130	10936	2569	4100	3772	5139	5030	6670	6014	8201	7107	9294
135	11882	2792	4455	4099	5584	5465	7248	6535	8911	7723	10099
140	12867	3023	4825	4439	6047	5918	7848	7076	9650	8363	10936
145	13892	3264	5209	4792	6529	6390	8474	7640	10419	9029	11808
150	14957	3514	5608	5160	7029	6880	9123	8226	11217	9722	12713
155	15614	3669	5855	5386	7338	7182	9524	8587	11710	10419	13271
160	16741	3934	6277	5775	7868	7700	10212	9207	12555	10881	14229
165	17907	4208	6715	6177	8416	8237	10923	9848	13430	11639	15220
170	19113	4491	7167	6593	8983	8791	11658	10512	14334	12423	16246
175	20358	4784	7634	7023	9568	9364	12418	11196	15268	13232	17304
180	21642	5085	8115	7466	10171	9955	13201	11903	16231	14067	18395
185	22965	5396	8611	7922	10793	10563	14008	12630	17223	14927	19520
190	24328	5717	9123	8393	11434	11190	14840	13380	18246	15813	20678
195	25730	6046	9648	8876	12093	11835	15695	14151	19297	16724	21870
200	27171	6385	10189	9373	12770	12498	16574	14944	20378	17661	23095
210	30171	7090	11314	10408	14180	13878	18404	16594	22628	19611	25645
220	33329	7832	12498	11498	15664	15331	20330	18330	24996	21663	28329
230	36643	8611	13741	12641	17222	16855	22352	20153	27482	23817	31146
240	40114	9426	15042	13839	18853	18452	24469	22062	30085	26074	34906
250	43743	10279	16403	15091	20559	20121	26683	24058	32807	28432	37181

Note:
Theoretical Yield Load=Yield Strengthx Effective Sectional Area
Theoretical Break Load=Tensile Strength xEffective Sectional Area

Equal Strength Steel Tension Rod Mechanical Property

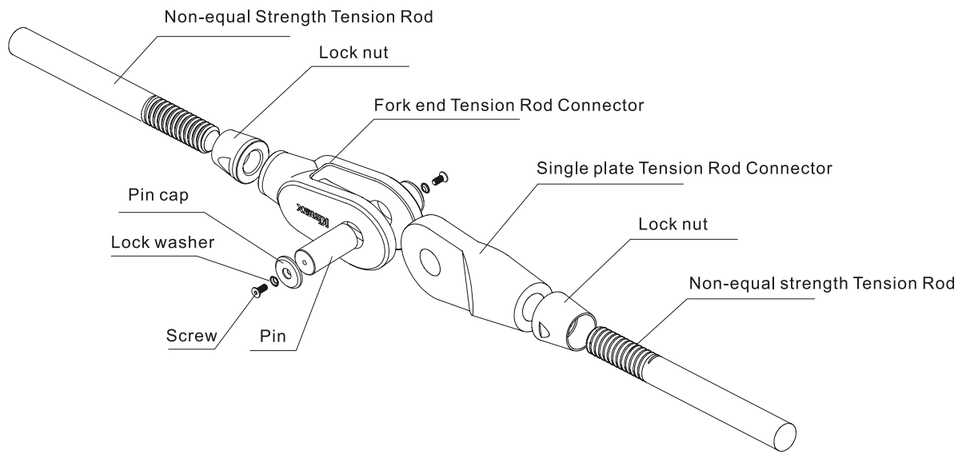
minal Diameter Φ (mm)	Rod Effective Sectional Area (mm^2)	Theoretical Load (kN) ≥									
		A(235)		B(345)		C(460)		D(550)		E(650)	
		yield load	break load	yield load	break load	yield load	break load	yield load	break load	yield load	break load
16	201	47	75	69	94	92	122	110	150	130	170
20	314	73	117	108	147	144	191	172	235	204	266
25	490	115	183	169	230	225	298	269	367	318	416
30	706	165	264	243	331	324	430	388	529	458	600
35	962	226	360	331	452	442	586	529	721	625	817
40	1256	295	471	433	590	577	766	690	942	816	1067
45	1590	373	596	548	747	731	969	874	1192	1033	1351
50	1963	461	736	677	922	902	1197	1079	1472	1275	1668
55	2375	558	890	819	1116	1092	1448	1306	1781	1543	2018
60	2827	664	1060	975	1328	1300	1724	1554	2120	1837	2402
65	3318	779	1244	1144	1559	1526	2023	1824	2488	2156	2820
70	3848	904	1443	1327	1808	1770	2347	2116	2886	2501	3270
75	4417	1037	1656	1523	2075	2031	2694	2429	3312	2871	3754
80	5026	1181	1884	1733	2362	2311	3065	2764	3769	3266	4272
85	5674	1333	2127	1957	2666	2610	3461	3120	4255	3688	4822
90	6361	1494	2385	2194	2989	2926	3880	3498	4770	4134	5406
95	7088	1665	2658	2445	3331	3260	4323	3898	5316	4607	6024
100	7853	1845	2944	2709	3690	3612	4790	4319	5889	5104	6675
105	8659	2034	3247	2987	4069	3983	5281	4762	6494	5628	7360
110	9503	2233	3563	3278	4466	4371	5796	5226	7127	6176	8077
115	10386	2440	3894	3583	4881	4777	6335	5712	7789	6750	8828
120	11309	2657	4240	3901	5315	5202	6898	6219	8481	7350	9612
125	12271	2883	4601	4233	5767	5644	7485	6749	9203	7976	10430
130	13273	3119	4977	4579	6238	6105	8096	7300	9954	8627	11282
135	14313	3363	5367	4937	6727	6583	8730	7872	10734	9303	12166
140	15393	3617	5772	5310	7234	7080	9389	8466	11544	10005	13084
145	16512	3880	6192	5696	7760	7595	10072	9081	12384	10732	14035
150	17671	4152	6626	6096	8305	8128	10779	9719	13253	11486	15020
155	18869	4434	7075	6509	8868	8679	11510	10377	14151	12264	16038
160	20106	4724	7539	6936	9449	9248	12264	11058	15079	13068	17090
165	21382	5024	8018	7376	10049	9835	13043	11760	16036	13898	18174
170	22698	5334	8511	7830	10668	10441	13845	12483	17023	14753	19293
175	24052	5652	9019	8297	11304	11063	14671	13228	18039	15633	20444
180	25446	5979	9542	8778	11959	11705	15522	13995	19084	16539	21629
185	26880	6316	10080	9273	12633	12364	16396	14784	20160	17472	22848
190	28352	6662	10632	9781	13325	13041	17294	15593	21264	18428	24099
195	29864	7018	11199	10303	14036	13737	18217	16425	22398	19411	25384
200	31415	7382	11780	10838	14765	14450	19163	17278	23561	20419	26702
210	34636	8139	12988	11949	16278	15932	21127	19049	25977	22513	29440
220	38013	8933	14254	13114	17866	17485	23187	20907	28509	24708	32311
230	41547	9763	15580	14333	19527	19111	25343	22850	31160	27005	35314
240	45238	10630	16964	15607	21261	20809	27595	24880	33928	29404	38452
250	49087	11535	18407	16935	23070	22580	29943	26997	36815	31906	41723

Note:
Refer to the provision shown in JGJ257-2012 Cable Structure Technical Specification,
the designed value of loading capacity of steel tension rod is breaking load value divided by 1.7
Customers can choose appropriate steel tension rod according to above mentioned parameters

Tension Rod for Buildings and Bridges

Non-equal Strength Tension Rod Series

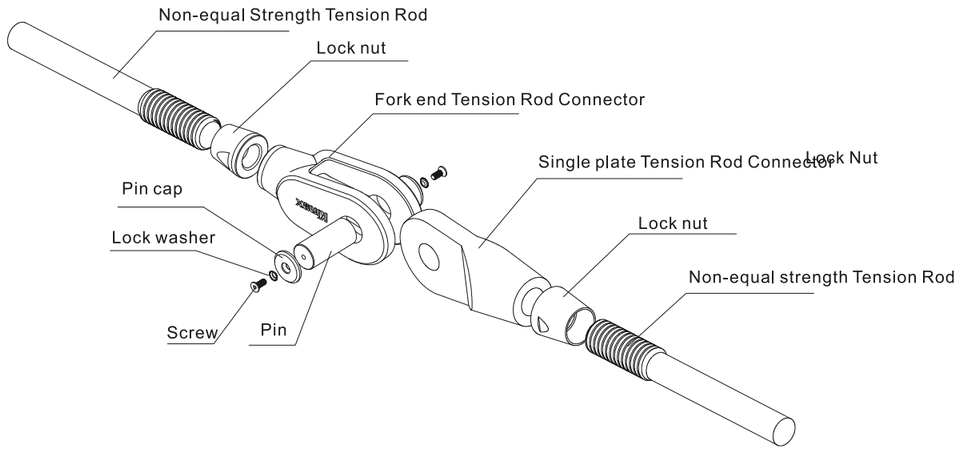
Non-equal strength tension rods apply non-egual-strength design. the thread on the ends of tension rod is machined directly the weakest part of the whole tension rod is the thread, so the loading capacity of the thread is the loading capacity of the whole tension rod.?Non-equal strength tension rod is convenient to produce and has shorter lead time.



Equivalent Strength Tension Rod Series

Equal strength tension rods apply equal strength design,the thread part is machined after upsetting process,the weakest part of the whole tension rod is the rod body, so the loading capability of the rod is the loading capability of the whole tension rod.

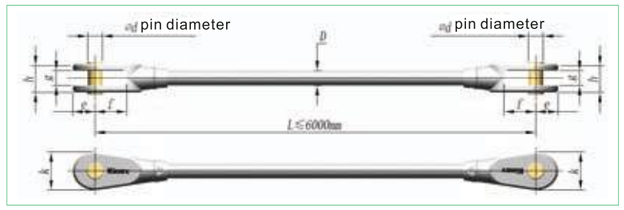
Based on the same specification, the equal strength tension rod has loading capacity and use less material, decreasing the dead load of the structure and saving cost. The larger the diameter, the more obvious advantage.



Tension Rod for Buildings and Bridges

Spiro Union Tension Rod with Fork Head(tensionable)
Matching ear plate
Model:LG01(Equal Strength)/LG04(Non-equal Strength)

Parameter Table of Spiro Union Tension Rod（ϕ16-ϕ115） with Double Ear (tensionable)



model instruction
LG01X-X(LG04X-X)
- rod diameter
- strength grade (A、B、C、D、E)

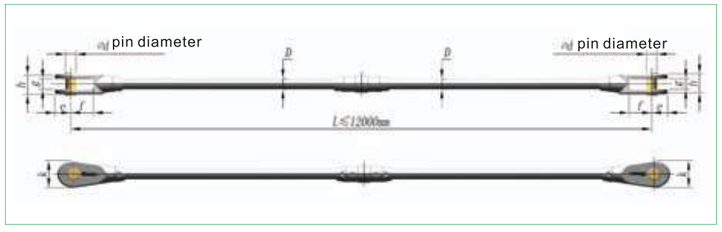
Note: The quantity of connector can be finalized according to the length of steeltension rod or requlating distance.

Rod Diameter (D)	Thread Specification		e	f	g	h	d	k	Single Side Adjustment Capacity
	Equivalent strength (LG01)	Non-equivalent strength (LG04)							
Φ16	M20x2.5	M16x2	27	35	16	33	15.5	47	10
Φ20	M24x3	M20x2.5	33	45	20	42	19.5	57	10
Φ25	M30x3.5	M25x3	40	54	25	53	24.5	69	10
Φ30	M36x4	M30x3.5	49	70	30	63	29.5	86	12
Φ35	M39x4	M35x4	55	80	35	74	34.5	96	13
Φ40	M45x4.5	M40x4	62	90	40	82	39.5	108	13
Φ45	M52x5	M45x4.5	71	105	45	92	44.5	123	14
Φ50	M56x5.5	M50x5	78	115	50	102	49.5	136	17
Φ55	M64x6	M55x5.5	86	125	55	112	54.5	150	17
Φ60	M68x6	M60x5.5	92	130	60	123	59.5	160	17
Φ65	M72x6	M65x6	99	145	65	133	64.5	173	20
Φ70	M80x6	M70x6	105	154	70	142	69	175	20
Φ75	M85x6	M75x6	112	165	75	152	74	188	20
Φ80	M90x6	M80x6	120	176	80	162	79	200	20
Φ85	M95x6	M85x6	128	187	85	173	84	213	22
Φ90	M100x6	M90x6	136	198	90	182	89	225	22
Φ95	M105x6	M95x6	143	209	95	193	94	238	24
Φ100	M110x6	M100x6	151	220	100	202	99	250	24
Φ105	M115x6	M105x6	159	231	105	213	104	263	25
Φ110	M120x6	M110x6	167	242	110	222	109	275	28
Φ115	Tr125x6	M112x6	174	253	115	233	114	288	28

Tension Rod for Buildings and Bridges

Spiro Union Tension Rod with Fork end & Adjustable Sleeve(tensionable)
(Matching ear plate:EB series)
Model: LG01T(Equal Strength)/LG04T(Non-equal Strength)

Parameter Table of Spiro Union Tension Rod (φ120-φ250) with Fork end (tensionable)



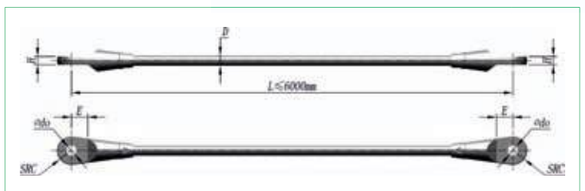
model instruction
LG01TX-X(LG04TX-X)
- rod diameter
- strength grade (A、B、C、D、E)
- strength grade sleeve's chinese word's pinyin initials(T)

Note: The quantity of adjustable sleeve can be finalized according to the length of steel tension rod or regulating distance.

rod diameter (D)	thread specification		e	f	g	h	d	k	Single Side Adjustment Capacity
	equal-strength(LG01)	non-equal-strength (LG04)							
Φ120	Tr130x6	M118x6	180	260	120	230	119	308	28
Φ125	Tr135x6	Tr122x6	188	270	125	240	124	330	30
Φ130	Tr140x6	Tr125x6	195	280	130	250	129	338	30
Φ135	Tr145x6	Tr130x6	203	290	135	260	134	352	30
Φ140	Tr150x6	Tr135x6	210	300	140	270	139	360	35
Φ145	Tr155x6	Tr140x6	218	310	145	280	144	376	35
Φ150	Tr160x6	Tr145x6	225	320	150	290	149	386	35
Φ155	Tr165x8	Tr150x8	233	330	155	300	154	398	37
Φ160	Tr170x8	Tr155x8	240	340	160	310	159	410	37
Φ165	Tr175x8	Tr160x8	248	350	165	320	164	424	40
Φ170	Tr180x8	Tr165x8	255	360	170	330	169	444	40
Φ175	Tr185x8	Tr170x8	264	370	175	340	174	456	42
Φ180	Tr190x8	Tr175x8	270	380	180	350	179	464	42
Φ185	Tr195x8	Tr180x8	278	390	185	360	184	482	45
Φ190	Tr200x8	Tr185x8	285	400	190	370	189	494	45
Φ195	Tr205x8	Tr190x8	294	410	195	380	194	508	45
Φ200	Tr210x8	Tr195x8	300	423	200	380	199	510	45
Φ210	Tr220x8	Tr205x8	308	440	210	410	209	515	50
Φ220	Tr230x8	Tr215x8	315	450	220	425	219	525	50
Φ230	Tr240x8	Tr225x8	320	460	230	445	229	550	50
Φ240	Tr250x8	Tr235x8	328	470	240	465	239	575	50
Φ250	Tr260x8	Tr245x8	335	480	250	485	249	600	50

Tension Rod for Buildings and Bridges

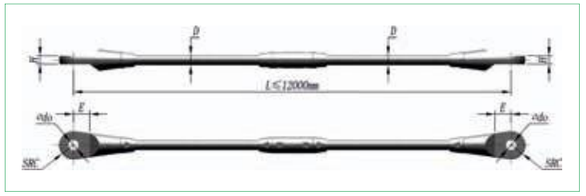
Spiro Union Tension Rod with Plate anchor
(tensionable)
Model:LG02(Equal Strength)/LG05(Non-equal Strength)



model instruction
LG02X-X(LG05X-X)
- rod diameter
- strength grade (A、B、C、D、E)

Spiro Union Tension Rod with Plate anchor & Adjustable Sleeve
(tensionable)
Model:LG02T(Equal Strength)/LG05T(Non-equal Strength)

Pin diameter



model instruction
LG02TX-X(LG05TX-X)
- rod diameter
- strength grade (A、B、C、D、E)
- strength grade The first letter of Chinese Pinyin (T)

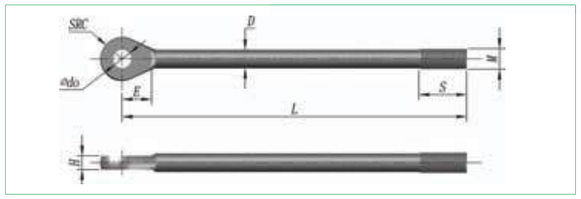
Note: The quantity of adjustable sleeve can be finalized according to the length of steel tension rod or regulating distance.

rod diameter (D)	thread specification		C	E	H	do	Single Side Adjustment Capacity
	equal-strength (LG01)	non-equal-strength (LG04)					
Φ16	M20x2.5	M16x2	24	32	14	16	10
Φ20	M24x3	M20x2.5	30	40	18	20	10
Φ25	M30x3.5	M25x3	38	50	22	25	10
Φ30	M36x4	M30x3.5	45	60	28	30	12
Φ35	M39x4	M35x4	53	70	32	35	13
Φ40	M45x4.5	M40x4	60	80	36	40	13
Φ45	M52x5	M45x4.5	68	90	41	45	14
Φ50	M56x5.5	M50x5	75	100	46	50	17
Φ55	M64x6	M55x5.5	83	110	50	55	17
Φ60	M68x6	M60x5.5	90	120	56	60	17
Φ65	M72x6	M65x6	98	130	60	65	20
Φ70	M80x6	M70x6	105	140	65	70	20
Φ75	M85x6	M75x6	113	150	70	75	20
Φ80	M90x6	M80x6	120	160	74	80	20

rod diameter (D)	thread specification		C	E	H	do	Single Side Adjustment Capacity
	equal-strength (LG01)	non-equal-strength (LG04)					
Φ85	M95x6	M85x6	128	170	79	85	22
Φ90	M100x6	M90x6	135	180	84	90	22
Φ95	M105x6	M95x6	143	190	88	95	24
Φ100	M110x6	M100x6	150	200	93	100	24
Φ105	M115x6	M105x6	158	210	98	105	25
Φ110	M120x6	M110x6	165	220	102	110	28
Φ115	Tr125x6	M112x6	173	230	107	115	28
Φ120	Tr130x6	M118x6	180	240	112	120	28
Φ125	Tr135x6	Tr122x6	188	250	116	125	30
Φ130	Tr140x6	Tr125x6	195	260	121	130	30
Φ135	Tr145x6	Tr130x6	203	270	126	135	30
Φ140	Tr150x6	Tr135x6	210	280	130	140	35
Φ145	Tr155x6	Tr140x6	218	290	135	145	35
Φ150	Tr160x6	Tr145x6	225	300	140	150	35

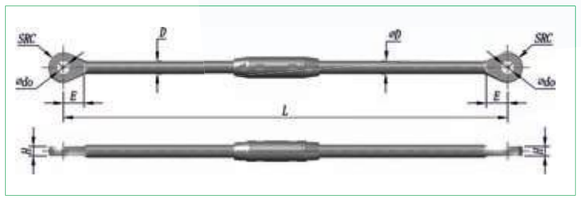
Tension Rod for Buildings and Bridges

Forged Tension Rod with Plate anchor
Model:LG03(Equal Strength)/LG06(Non-equal Strength)



model instruction
LG03X-X(LG06X-X)
- rod diameter
- strength grade (A、B、C、D、E)

Foged Tension Rod with Plate anchor & Adjustable Sleeve
Model:LG03T(Equal Strength)/LG06T(Non-equal Strength)



model instruction
LG03TX-X(LG06TX-X)
- rod diameter
- strength grade (A、B、C、D、E)
- strength grade The first letter of Chinese Pinyin (T)

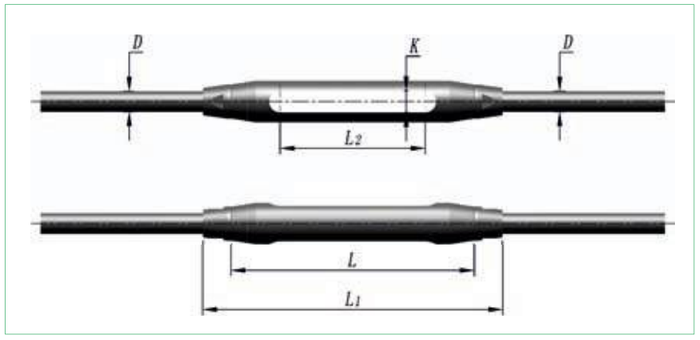
Note: The quantity of adjustable sleeve can be finalized according to the length of steel tension rod or regulating distance.

rod diameter (D)	thread specification		C	E	H	S	do	Single Side Adjustment Capacity
	equal-strength (LG01)	non-equal-strength (LG04)						
Φ16	M20x2.5	M16x2	19	25	12	57	16	10
Φ20	M24x3	M20x2.5	24	32	15	63	20	10
Φ25	M30x3.5	M25x3	30	40	19	72	25	10
Φ30	M36x4	M30x3.5	36	48	23	88	30	12
Φ35	M39x4	M35x4	41	55	27	95	35	13
Φ40	M45x4.5	M40x4	48	65	30	102	40	13
Φ45	M52x5	M45x4.5	54	73	34	110	45	14
Φ50	M56x5.5	M50x5	59	79	38	123	50	17
Φ55	M64x6	M55x5.5	65	87	42	135	55	17
Φ60	M68x6	M60x5.5	72	97	45	140	60	17
Φ65	M72x6	M65x6	77	103	49	150	65	20
Φ70	M80x6	M70x6	83	111	53	155	70	20
Φ75	M85x6	M75x6	89	120	57	169	75	20
Φ80	M90x6	M80x6	95	127	60	176	80	20

rod diameter (D)	thread specification		C	E	H	S	do	Single Side Adjustment Capacity
	equal-strength (LG01)	non-equal-strength (LG04)						
Φ85	M95x6	M85x6	101	136	64	188	85	22
Φ90	M100x6	M90x6	107	144	68	195	90	22
Φ95	M105x6	M95x6	112	150	72	206	95	24
Φ100	M110x6	M100x6	119	160	75	215	100	24
Φ105	M115x6	M105x6	124	166	79	225	105	25
Φ110	M120x6	M110x6	130	174	83	237	110	28
Φ115	Tr125x6	M112x6	136	182	87	245	115	28
Φ120	Tr130x6	M118x6	142	190	90	242	120	28
Φ125	Tr135x6	Tr122x6	152	196	96	254	125	30
Φ130	Tr140x6	Tr125x6	162	202	100	260	130	30
Φ135	Tr145x6	Tr130x6	172	210	104	274	135	30
Φ140	Tr150x6	Tr135x6	182	218	108	283	140	35
Φ145	Tr155x6	Tr140x6	192	224	112	289	145	35
Φ150	Tr160x6	Tr145x6	202	230	116	295	150	35

Tension Rod for Buildings and Bridges

Hollow Spindle-shaped Adjustable Sleeve
Model:LJT03



model instruction
LJT03X-X
- rod diameter
- strength grade (A、B、C、D、E)

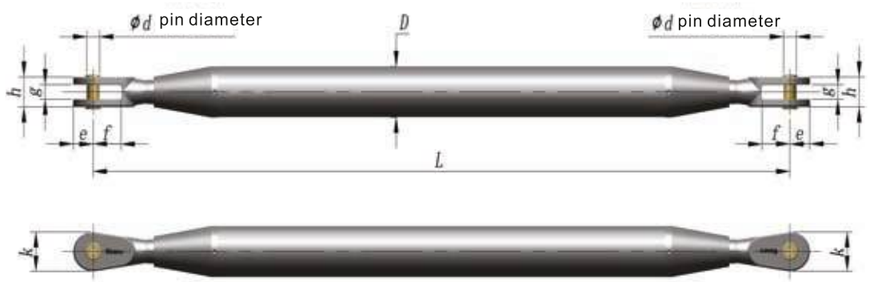
Hollow Spindle-shaped Adjustable Sleeve series Parameters Table

rod diameter(D)	thread specification	K	L	L_1	L_2	Single Side Adjustment Capacity
Φ16	M16x2	18	244	308	132	10
Φ20	M20x2.5	22	262	332	134	10
Φ25	M25x3	27	282	358	140	10
Φ30	M30x3.5	32	384	478	218	12
Φ35	M35x4	37	412	516	238	13
Φ40	M40x4	42	472	582	280	13
Φ45	M45x4.5	47	530	650	330	14
Φ50	M50x5	52	580	720	348	17

Tension Rod for Buildings and Bridges

Compression Strut

Model: YG01



Note:Verify the calculation of compression strut overall compressive bearing capacity according to project actual condition.

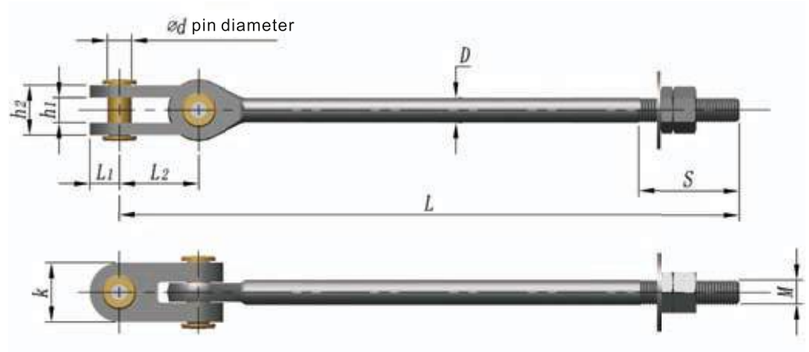
rod diameter (D)	Compression Strut Specification(D)	thread specification	e	f	g	h	d	k	Single Side Adjustment Capacity
YG01-16	Φ48x5	M20	27	35	16	33	15.5	47	10
YG01-20	Φ60x5	M24	33	45	20	42	19.5	57	10
YG01-25	Φ76x5	M30	40	54	25	53	24.5	59	15
YG01-30	Φ89x5	M36	49	70	30	63	29.5	86	15
YG01-35	Φ114x6.5	M39	55	80	35	74	34.5	96	20
YG01-40	Φ140x10	M45	62	90	40	82	39.5	108	20
YG01-50	Φ168x10	M56	78	115	50	102	49.5	136	30
YG01-55	Φ194x10	M64	86	125	55	112	54.5	150	30
YG01-65	Φ219x13	M72	99	145	65	133	64.5	173	40
YG01-75	Φ245x16	M85	112	165	75	152	74	188	40
YG01-80	Φ273x16	M90	120	176	80	162	79	200	50
YG01-90	Φ325x16	M100	136	198	90	182	89	225	50

Other non-standard specifications can be customized according to project's actual requirements.

Tension Rod for Buildings and Bridges

Membrance Structure Tension Rod

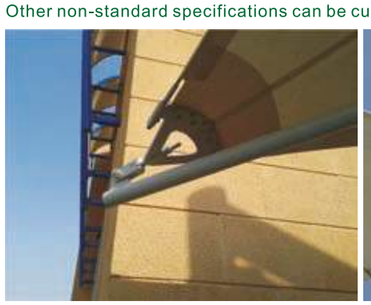
Model:MLG01

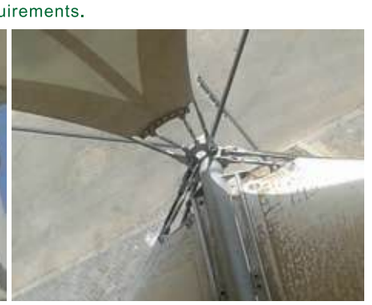


Note: Tension rod and accesories used for membrance structure can tense and fix the membrance structure, making the whole structure light and beautiful.Specific strength,specification,detailed size can be customized depending on the usage requirement.

rod diameter (D)	thread specification	L_1	L_2	h_1	h_2	k	d	s
Φ12	M12x1.5	15	43	13	29	30	12	40
Φ16	M16x2	18	53	17	35	36	15.5	53
Φ20	M20x2.5	22	68	20	44	44	19.5	59
Φ25	M25x3	27	85	26	54	54	24.5	66
Φ30	M30x3.5	32.5	97	31	65	65	29.5	81

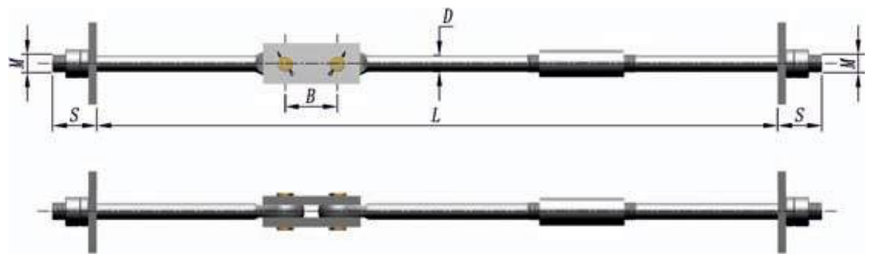
Other non-standard specifications can be customized according to project's actual requirements.





Shipbuilding Yard and Seaport Tension Rod System

Shipbuilding Yard and Seaport Tension Rod
Model:CLG



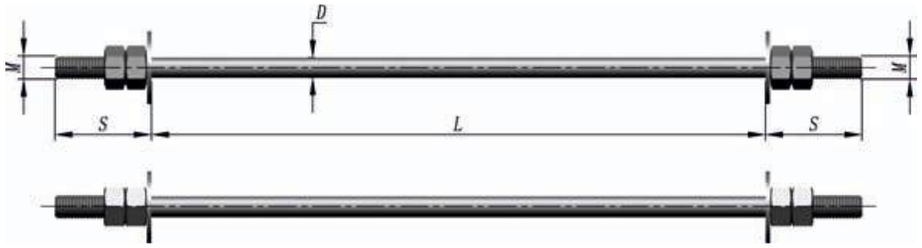
Note: The quantity of adjustable sleeve can be finalized according to the length of steel tension rod or regulating distance.

Rod Diameter (d)	Thread Specification	S	B	Single Side Adjustment Capacity
Φ40	M45x4.5	102	130	50
Φ45	M52x5	110	140	50
Φ50	M56x5.5	123	150	50
Φ55	M64x6	135	160	60
Φ60	M68x6	140	180	60
Φ65	M72x6	150	200	70
Φ70	M80x6	155	220	70
Φ75	M85x6	169	240	80
Φ80	M90x6	176	250	80
Φ85	M95x6	188	270	90
Φ90	M100x6	195	290	90
Φ95	M105x6	206	300	90

Rod Diameter (d)	Thread Specification	S	B	Single Side Adjustment Capacity
Φ100	M110x6	215	300	90
Φ105	M115x6	225	320	90
Φ110	M120x6	237	320	90
Φ115	Tr125x6	245	340	100
Φ120	Tr130x6	242	360	100
Φ125	Tr135x6	254	380	100
Φ130	Tr140x6	260	400	100
Φ135	Tr145x6	274	420	100
Φ140	Tr150x6	283	440	100
Φ145	Tr155x6	289	460	100
Φ150	Tr160x6	295	480	100

Anchor Series

High Strength Anchoring Tension Rod
Model：MG01



Note： The highest strenth grade of the threaded rod can be grade 850（ϕ20~ϕ130），grade 1100（ϕ20~ϕ80），can be selected depending on usage requirement.

Rod Diameter (d)	Thread Specification	S
Φ20	M24x3	63
Φ25	M30x3.5	72
Φ30	M36x4	88
Φ35	M39x4	95
Φ40	M45x4.5	102
Φ45	M52x5	110
Φ50	M56x5.5	123
Φ55	M64x6	135
Φ60	M68x6	140
Φ65	M72x6	150
Φ70	M80x6	155
Φ75	M85x6	169

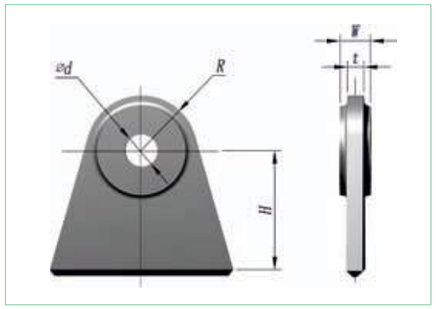
Rod Diameter (d)	Thread Specification	S
Φ80	M90x6	176
Φ85	M95x6	188
Φ90	M100x6	195
Φ95	M105x6	206
Φ100	M110x6	215
Φ105	M115x6	225
Φ110	M120x6	237
Φ115	Tr125x6	245
Φ120	Tr130x6	242
Φ125	Tr135x6	254
Φ130	Tr140x6	260

Ear Plate Series

Universal ear plate

Matching rod: LG01/ LG04/ LG01T/ LG04T/ YG01 series

model: EB



model instruction

EB-X

matching rod specification

Note:

1. The following table is the basic reference size of the ear plate. The length of the welding seam of the ear plate is determined according to the actual situation of the steel structure, and the stiffened plate can also be welded on the side of the ear plate.
2. The ear plate material is recommended to use Q355 steel to match with 460Mpa and below grades. The ear plate material is recommended to use Q390 steel to match with grade 460Mpa.The ear palte material is recommended to use Q420 steel to match with grade 650MPa

Model	d	R	H	t	W	Model	d	R	H	t	W
EB-16	Φ17	27	60	14	-	EB-125	Φ126	210	340	75	119
EB-20	Φ21	35	65	18	-	EB-130	Φ131	220	360	80	124
EB-25	Φ26	48	75	22	-	EB-135	Φ136	230	380	85	129
EB-30	Φ31	57	85	28	-	EB-140	Φ141	240	390	90	134
EB-35	Φ36	65	100	32	-	EB-145	Φ146	245	400	95	139
EB-40	Φ41	78	120	28	36	EB-150	Φ151	255	405	100	144
EB-45	Φ46	83	150	32	41	EB-155	Φ156	260	410	105	147
EB-50	Φ51	90	160	32	46	EB-160	Φ161	270	420	110	152
EB-55	Φ56	95	170	34	50	EB-165	Φ166	280	430	115	157
EB-60	Φ61	107	180	36	56	EB-170	Φ171	285	435	120	162
EB-65	Φ66	112	200	36	60	EB-175	Φ176	295	445	125	167
EB-70	Φ71	125	210	40	66	EB-180	Φ181	305	450	130	172
EB-75	Φ76	137	220	40	70	EB-185	Φ186	315	460	135	177
EB-80	Φ81	148	230	45	75	EB-190	Φ191	320	465	140	182
EB-85	Φ86	155	250	50	80	EB-195	Φ196	330	475	145	187
EB-90	Φ91	162	270	55	85	EB-200	Φ202	335	480	150	192
EB-95	Φ96	172	280	60	90	EB-210	Φ212	340	490	150	202
EB-100	Φ101	182	290	60	94	EB-220	Φ222	350	495	160	212
EB-105	Φ106	187	300	65	99	EB-230	Φ232	355	500	170	222
EB-110	Φ111	192	310	70	104	EB-240	Φ242	360	510	180	232
EB-115	Φ116	202	320	75	109	EB-250	Φ252	370	520	190	242
EB-120	Φ121	205	330	75	113						

Tension Rod for Buildings and Bridges

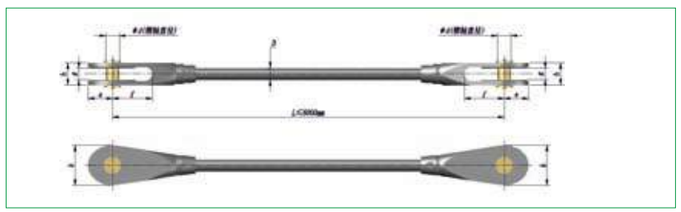
Compliant with steel structure design standards

Fork end tension rod(tensionable)

Product code: LG07(Equivalent strength)/LG08(non-equal strength

Comply with the strength check requirements and structural requirements of GB50017"Standards for Design of Steel Structures"

Spiro Union Tension Rod with Fork end(tensionable)series parameter sheet(ϕ16~ϕ115)



model instruction

LG07X-X (LG08X-X)

rod diameter

strength grade (B、C、D、E)

Note:The quantity of adjustable sleeves can be finalized according to the length of steel tension rod or regulating distance

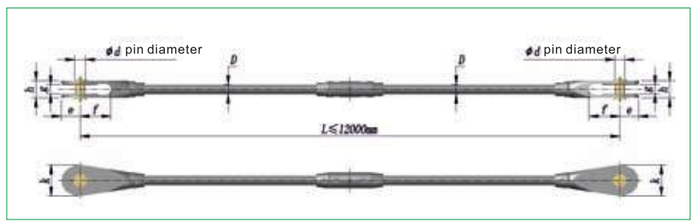
Rod Diameter (d)	Thread Specification		e	f	g	h	d	k	Single Side Adjustment Capacity
	Equal-strength(lg01)	Non-equal-strength (lg04)							
Φ16	M20x2.5	M16x2	45	65	17	31	19	72	10
Φ20	M24x3	M20x2.5	52	82	21	38	24	83	10
Φ25	M30x3.5	M25x3	61	91	25	47	29	98	10
Φ30	M36x4	M30x3.5	67	104	30	56	35	109	12
Φ35	M39x4	M35x4	75	117	35	65	40	122	13
Φ40	M45x4.5	M40x4	83	135	39	75	46	136	13
Φ45	M52x5	M45x4.5	91	149	44	84	51	149	14
Φ50	M56x5.5	M50x5	100	165	48	92	57	163	17
Φ55	M64x6	M55x5.5	109	182	53	104	63	180	17
Φ60	M68x6	M60x5.5	118	194	57	112	68	193	17
Φ65	M72x6	M65x6	127	209	62	124	74	209	20
Φ70	M80x6	M70x6	135	223	66	132	79	222	20
Φ75	M85x6	M75x6	144	238	71	144	85	238	20
Φ80	M90x6	M80x6	154	256	75	155	91	254	20
Φ85	M95x6	M85x6	162	272	79	163	96	267	22
Φ90	M100x6	M90x6	172	289	84	175	103	284	22
Φ95	M105x6	M95x6	180	303	89	184	108	297	24
Φ100	M110x6	M100x6	190	316	93	195	114	313	24
Φ105	M115x6	M105x6	197	334	98	204	119	326	25
Φ110	M120x6	M110x6	207	351	102	215	125	342	28
Φ115	Tr125x6	M112x6	217	365	107	225	131	358	28

Accord with steel structure design standards fork end tension rod(tensionable)

Product code:LG07T(equal strength)/
LG08T(non-equal-strength)

Comply with the strength check requirements and structural requirements of GB50017"Standards for Design of Steel Structures"

Spiro Union Tension Rod with Fork End(tensionable)series parameter sheet(ϕ120~ϕ200)



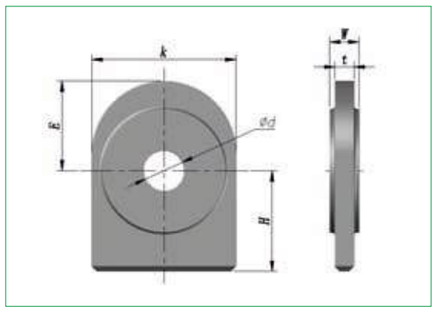
model instruction
LG07TX-X(LG08TX-X)
- rod diameter
- strength grade (A、B、C、D、E)
- strength grade sleeve's chinese word's pinyin initials(T)

Note:The quantity of adjustable sleeves can be finalized according to the length of steel tension rod or regulating distance.

Rod Diameter (d)	Thread Specification		e	f	g	h	d	k	Single Side Adjustment Capacity
	Equal-strength(lg01)	Non-equal-strength (lg04)							
Φ120	Tr130x6	M118x6	225	381	114	238	137	372	28
Φ125	Tr135x6	Tr122x6	235	392	118	247	142	387	30
Φ130	Tr140x6	Tr125x6	243	408	122	257	148	401	30
Φ135	Tr145x6	Tr130x6	250	416	127	266	153	414	30
Φ140	Tr150x6	Tr135x6	260	439	131	277	159	430	35
Φ145	Tr155x6	Tr140x6	270	455	135	286	165	446	35
Φ150	Tr160x6	Tr145x6	278	470	140	297	170	459	35
Φ155	Tr165x8	Tr150x8	288	487	144	306	176	476	37
Φ160	Tr170x8	Tr155x8	297	503	148	317	182	492	37
Φ165	Tr175x8	Tr160x8	306	516	154	327	188	506	40
Φ170	Tr180x8	Tr165x8	315	527	160	340	194	522	40
Φ175	Tr185x8	Tr170x8	324	545	163	347	199	535	42
Φ180	Tr190x8	Tr175x8	333	560	168	359	205	551	42
Φ185	Tr195x8	Tr180x8	342	572	172	368	210	566	45
Φ190	Tr200x8	Tr185x8	350	592	177	379	216	580	45
Φ195	Tr205x8	Tr190x8	360	611	182	389	222	596	45
Φ200	Tr210x8	Tr195x8	368	624	185	398	227	609	45

Ear plate series

LG07/LG08 Matching Plate Anchor
Product code:GBEB
Comply with the strength check requirements and structural requirements of GB50017"Standards for Design of Steel Structures"



model instruction
GBEB-X
- Matching rod specification

Note:

1. The following table is the basic reference size of the ear plate. The length of the welding seam of the ear plate is determined according to the actual situation of the steel structure, and the stiffened plate can also be welded on the side of the ear plate.
2. The ear plate material is recommended to use Q355 steel.

Model	d	k	E	H	t	W	Model	d	k	E	H	t	W
GBEB-16	Φ20	84	53	60	8	14	GBEB-110	Φ128	448	278	310	72	96
GBEB-20	Φ25	105	67	65	12	18	GBEB-115	Φ134	466	289	320	75	101
GBEB-25	Φ30	118	74	75	14	22	GBEB-120	Φ140	484	300	330	78	106
GBEB-30	Φ37	133	83	85	16	26	GBEB-125	Φ145	497	308	340	80	110
GBEB-35	Φ42	150	93	100	19	31	GBEB-130	Φ151	519	322	360	84	114
GBEB-40	Φ48	172	107	120	23	35	GBEB-135	Φ156	528	326	380	85	119
GBEB-45	Φ53	189	118	150	26	40	GBEB-140	Φ162	558	345	390	91	123
GBEB-50	Φ59	211	132	160	30	44	GBEB-145	Φ168	580	359	400	95	127
GBEB-55	Φ66	234	145	170	34	48	GBEB-150	Φ173	597	370	405	98	132
GBEB-60	Φ71	247	154	180	36	52	GBEB-155	Φ180	620	384	410	102	136
GBEB-65	Φ77	265	165	200	39	57	GBEB-160	Φ186	642	397	420	106	140
GBEB-70	Φ82	286	177	210	43	61	GBEB-165	Φ192	656	406	430	108	144
GBEB-75	Φ88	304	188	220	46	66	GBEB-170	Φ198	667	414	435	110	150
GBEB-80	Φ94	326	202	230	50	70	GBEB-175	Φ203	695	430	445	115	153
GBEB-85	Φ99	347	216	250	54	74	GBEB-180	Φ209	712	441	450	118	158
GBEB-90	Φ106	370	229	270	58	78	GBEB-185	Φ214	726	449	460	120	162
GBEB-95	Φ111	387	240	280	61	83	GBEB-190	Φ220	752	465	465	125	167
GBEB-100	Φ117	401	249	290	63	87	GBEB-195	Φ226	778	481	475	130	172
GBEB-105	Φ122	426	264	300	68	92	GBEB-200	Φ231	795	492	480	133	175

Installation Instructions and Notes for Steel Tension Rod

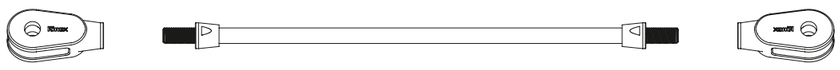
Steel Tension Rod Installation Instructions

1.step before assemble

assemble in factory

First,confirm the rotation direction of the thread rod,swaged end and locknut.

Second, rotate the locknut to the end of screw thread,shown in the picture.



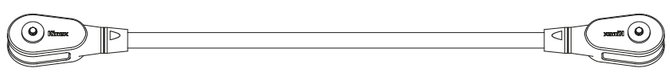
Third,rotate the swaged end onto the threaded rod with a certain screwed length specified in the drawing.

Fourth,rotate the lock nut back besides the swaged end.

Fifth,the pin roll is arranged on one end together with the pin shaft cover, anti lose washer and locking screw.

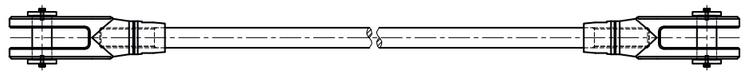
Sixth,put the pin roll into the hole,put the shaft cap,antilosing washer and a locking screw pin on the other end.

Complete the assembling

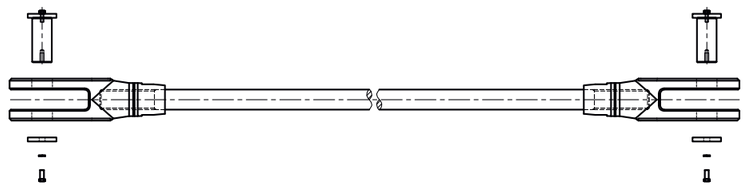


Construction Site Installation

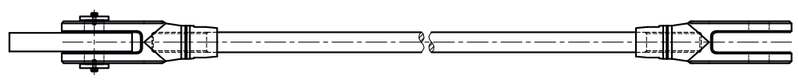
First,confirm the length and the installation position of steel rod.



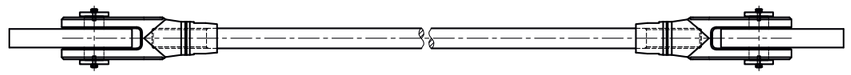
Second, dismantle the pin and the screw of the swaged end.



Third, align one end of steel rod with the ear plate and fix the pin, pin cover and screw.



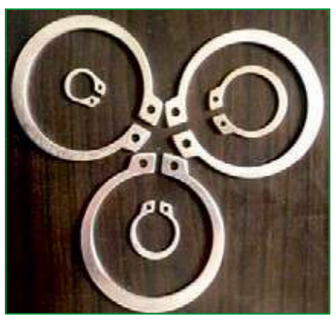
Fourth,connect the other end of steel rod with other ear plate.



For tension rod with diameter φ20 and below,U shape circlip is used to fix the pin.

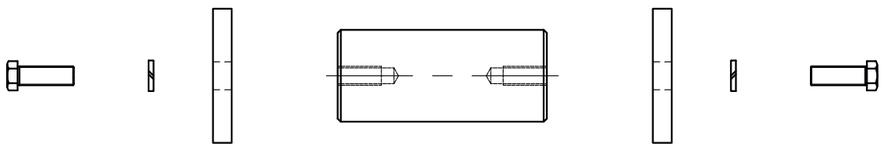
U-shape circlip installation schematic

U-shape circlip

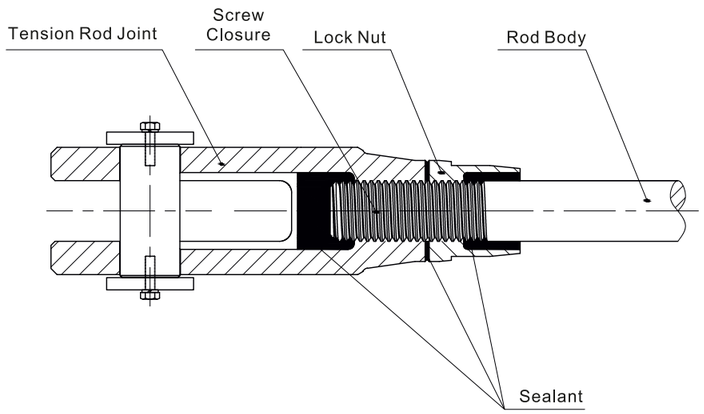


Circlip plier

For tension rod with diameter φ20 and above, hex. bolt is used to fix the pin. With the increase of the rod diameter, the quantity of hex. bolt can be increased to 2 to 3 pcs.



After completely installed,first clean the surface of the forks,adjustable sleeves and lock nuts; seal the joint part and the gap in the end of the lock nuts;lastly do surface treatment according to the anti-corrosion grade of the project.



Notes

1.Dragging,throwing and placing the tension rod in ground casually on the way to construction site is strictly prohibited.

2. Check the integrity of the label before installation. The forks are at the end of the steel rod, connecting ear plate by pin, pin cover and screw.As they are small parts and easily to lose,please check if these accessories are complete before installation.Also check if the surface of accessories is scratched or painted out. Please re-paint them to avoid rust if they are scratched or painted out.

3. Tension rod should be put carefully on the wood pad instead of being put on ground directly during installation. to protect the accessories and the thread from sticking to dust to affect installation.

4.Steel tension rod and accessories should not be moved by lifting equipment with oil.

5.The corrosion-proof ability of tension rod without painting completely is greatly different from that of stainless steel. It will rust quickly under the humid environment or the finish is damaged. We suggest install the steel tension rods as soon as the products are delivered to the construction site and paint them with the steel structure together after installation.

Cast Steel Joint

As a professional construction hardware manufacturer, with many years experience on the casting technoloqy,now we have developed the cast steel joint to match cable and rod. General materials of cable clamp and cast steeljoint are premium low alloy cast steel, which conforms to the requirement of CECS235:2008 Technical Specification of Cast Steel Joint Application and has been applied to many mega projects.

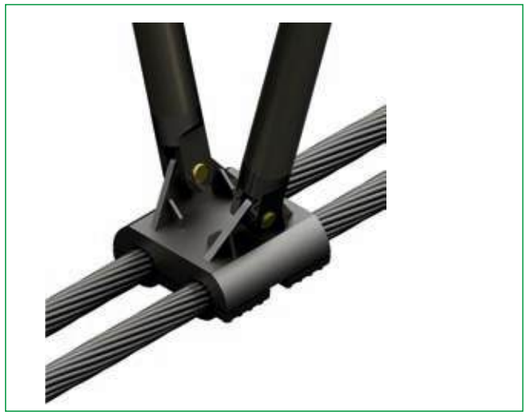
Special Joints for Cable and Rod

As an active element in cable and rod structure, cable-rod joints play an important role in finding beauty in the structure.Excellent desiqn of cable-rod joints is not only conducive to the formation of the structure, but also can bring convenience to construction and installation.

The cable-head joints are usually connected with the matched cable-head&cable end by extending the ear plate on the connecting rod,and are often connected with the support joints. The corresponding support joints often need to release the displacement in the corresponding direction. The ear plate of the cable head should not only keep the same angle with the cable and rod, but also ensure the exquisite and beautiful appearance in design.

Multi-junction joint

Lower beam support joint of structure



Clamp in Radial Direction

Clamp in Radial Direction

Annular dome supporting joint

Lower support joint of structure

Joint bearing cable clamp

Double-cable adjustable lower brace cable clamp

Confluence spherical equilibrium joint

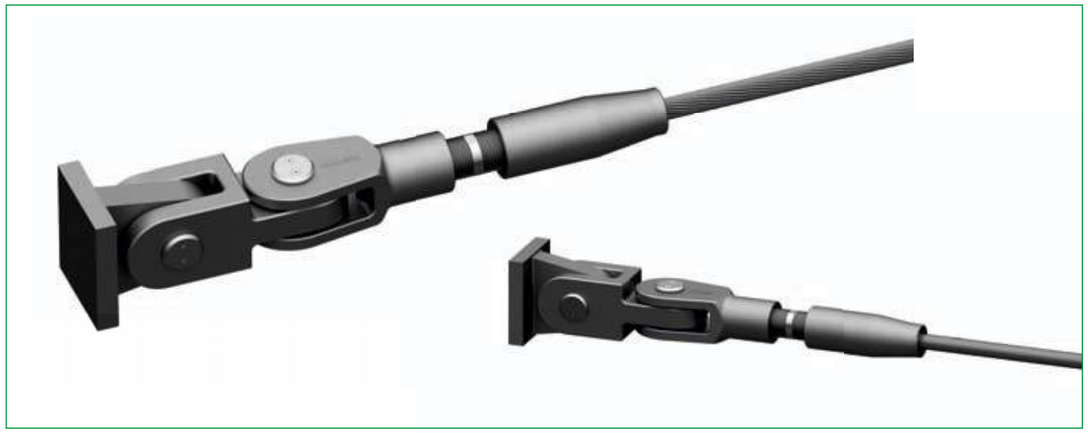
Confluence transform equilibrium joint

Lower brace ball cable clamp

Adjustable suspension cable clamp

Loop cable clamp

Loop cable clamp



Cable end anchor

Adjustable clamp with double brace cable

Double-cable suspension cable clamp

Adjustable hinge style cable clamp

Round center connection clamp

Adjustable center connection clamp

Fork joint

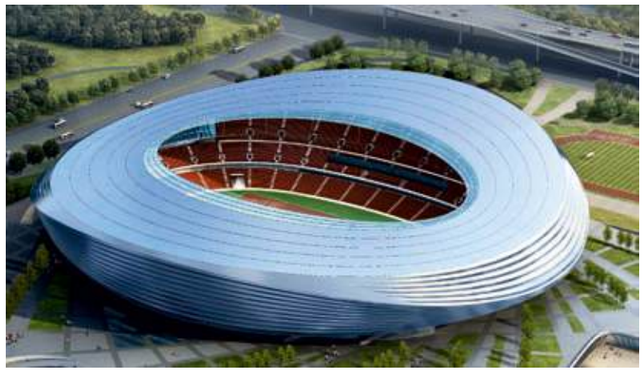
Project Case-stadium

◀ Project Case-stadium

Locked Coil Strand :
Φ75、Φ85、Φ105、Φ120

Qingyuan Olympic ▶ Sports Center

Locked Coil Strand:
Φ60、Φ80、Φ85

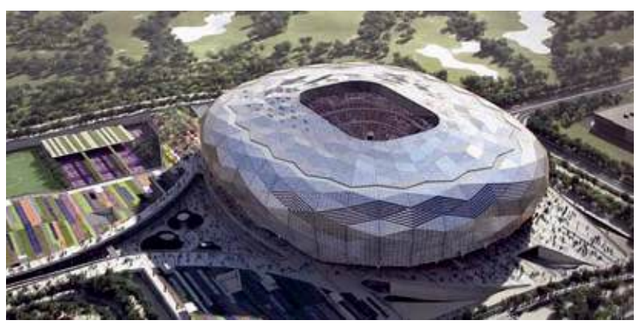


◀ Zhengzhou Olympic Sports Center

Galfan cable:
Φ16、Φ30、Φ38、Φ110、Φ116、
2× Φ119、Φ140
Locked Coil Strand: Φ130
cast steel

Qatar Foundation ▶ Stadium

Steel tension rod :
Φ80、Φ100



Project Case-Sharing (stadium)

Cambodia National Stadium

Galfan cable：
Φ36、Φ40、Φ50、Φ60、Φ70、Φ90、
Φ100、Φ110
Cast Steel

Ouhai District Olympic Sports Center

Galfan cable：
Φ40、Φ75、Φ110
cast steel cable clamp

Taishan Cultural Tourism Fitness Center

Locked Coil Strand：
Φ45、Φ55、Φ80
cast steel cable clamp

Bazhong Sports Center

Galfan cable：
Φ110、2XΦ113、Φ133

Rizhao Kuishan Sports Center

Galfan cable：
Φ22、Φ32、Φ80 、Φ110、
Φ114、Φ138
cast steel cable clamp

Xuzhou Olympic Sports Center

Galfan cable：
Φ70、Φ90、Φ100、Φ121、Φ127
Steel tension rod：Φ25

Jakarta International Stadium

Galfan cable：Φ110
cast steel cable clamp

Wenzhou Olympic Sports Center

Locked Coil Strand：Φ90

Project Case-exhibition center

China National Convention Center Phase II ▶

cast steel cable clamp：Φ95

◀ Qinghai International Convention and Exhibition Center

PEcable Φ5X163、Φ5X223
cast steel cable clamp

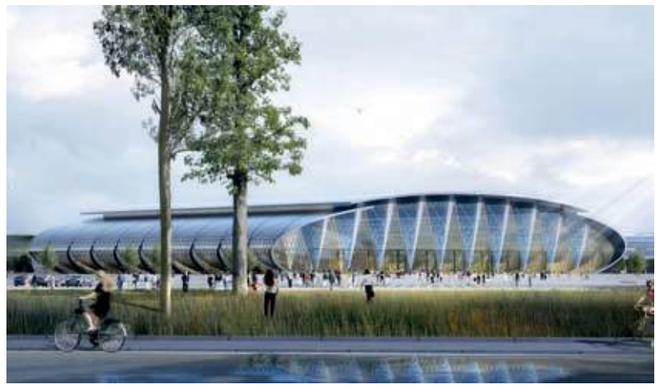
◀ Shijiazhuang International Exhibition Center

Galfan cable：
Φ60、Φ71、Φ80、Φ99、
Φ116、Φ133

Steel rod：Φ35、Φ40、Φ80
cast steel

Qingdao WorldExpo City ▶

PEcable：Φ7X583
cast steel cable clamp

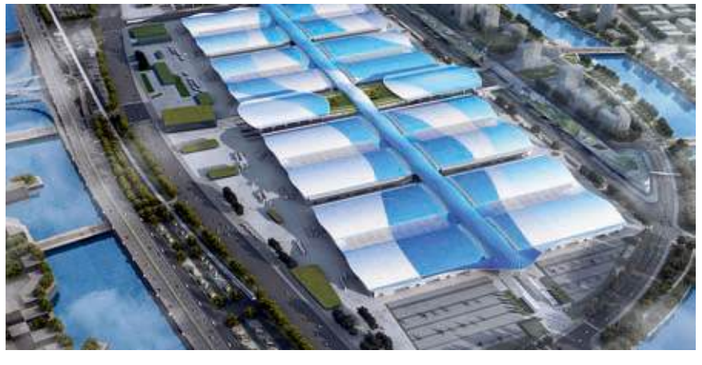


Tianjin National Convention and Exhibition Center ▶

cast steel：Φ25、Φ35、Φ55、Φ75、
Φ85、Φ95、Φ105、Φ115、Φ125

◀ Qingdao World Expo City

Glafan cable：Φ56、Φ68
Steel tension rod：Φ30、Φ35、Φ45、Φ50
cast steel joint and brace rods



◀ Shenzhen International Convention and Exhibition Center

Galfan cable：Φ25
Steel rod：Φ30
cast steel

Zhengzhou International Convention and Exhibition Center ▶

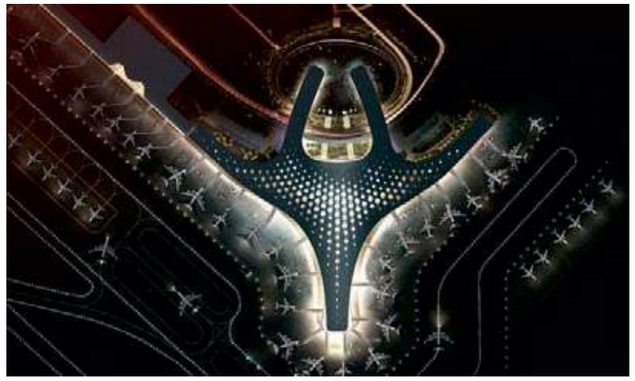
Galfan cable：Φ25
Steel rod：Φ40
cast steel cable clamp

Project Case-airport

Yueyang Sanhe Airport ▶

Galfan cable:
Φ12、Φ32、Φ36、Φ40、Φ48、Φ55、
Φ60、Φ70、Φ80、Φ85、Φ90、Φ140

cast steel cable clamp
Φ48、Φ55、Φ60、Φ70、



◀ Changchun Longjia Airport Phase II

Locked Coil Strand: Φ40

◀ Xinjiang Urumqi International Airport

steel tension rod:
Φ20、Φ25、Φ30、Φ35、
Φ80、Φ100、Φ120、Φ130

Saudi Jeddah airport ▶

steel tension rod: Φ25 、Φ60

Cambodia Phnom Penh International Airport ▶

steel tension rod: Φ65

◀ Guangzhou Baiyun Airport T2 Terminal

steel tension rod
Φ40、Φ45、Φ50、Φ55、Φ60、Φ70、
Φ75、Φ80

◀ Chengdu Tianfu International Airport

steel tension rod: Φ25、Φ30

Beijing New Airport (Capital Second Airport) ▶

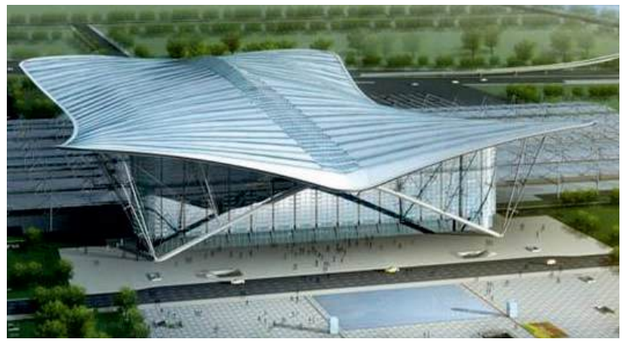
steel tension rod

Φ40、Φ50、Φ60、
Φ65、Φ70、Φ80、Φ120

Project case-transportation hub

Qingdao North Railway Station

Galfan cable:
Φ30 、 Φ50、 Φ60 、Φ74、Φ84
Φ106 、Φ126



Weifang North Railway Station

steel tension rod
Φ30、Φ40、Φ50、Φ80

Saudi Mecca Railway Station

steel tension rod： Φ150

Langfang Toll Station

Galfan cable:
Φ12、 Φ32、 Φ36、 Φ40、
Φ48、 Φ55、 Φ60、 Φ70、
Φ80、 Φ85、 Φ90、 Φ140
cast steel cable clamp

Project case-super high-rise building

Zhuhai Shizimen Central Business Tower

Galfan cable： Φ16 、 Φ50 、 Φ59

Shanghai International Financial Center

Galfan cable： Φ20 、 Φ28 、 Φ59
steel tension rod:Φ16

Dongguan International Trade Center

steel tension rod:Φ16、 Φ30、 Φ50

Shenzhen Ping An Financial Center

steel tension rod：Φ110

Project case- commercial complex

AIIB Headquarters Building ▶

Steel tension rod:
M30、M40、Φ35、
Bolt: Φ55 、Φ80、Φ100

◀ Shanghai Hongqiao SOHO Commercial Plaza

steel tension rod : Φ140 、Φ180

Qingdao Wanda Mall ▶

steel tension rod :
Φ50 、Φ55 、Φ60

◀ Chengdu Music Plaza

Galfan cable: ϕ48
cast steel cable clamp

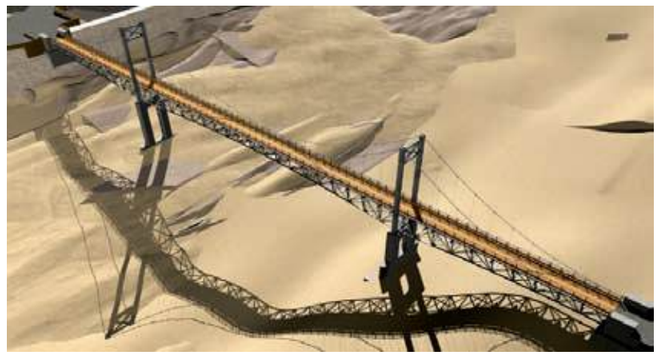
Project case-landscape footbridge

◀ Shanghai Disney Landscape Footbridge

Galfan cable: ϕ68、ϕ63
Locked coil strand: ϕ90、ϕ115
Steel tension rod: ϕ16
cast steel

Saudi SABIC Suspension Cable Footbridge ▶

Galfan cable:Φ30、Φ80
cast steel cable clamp



◀ Shi Lin Gorge Glass Landscape Platform

Galfan cable: Φ20、Φ30、Φ50

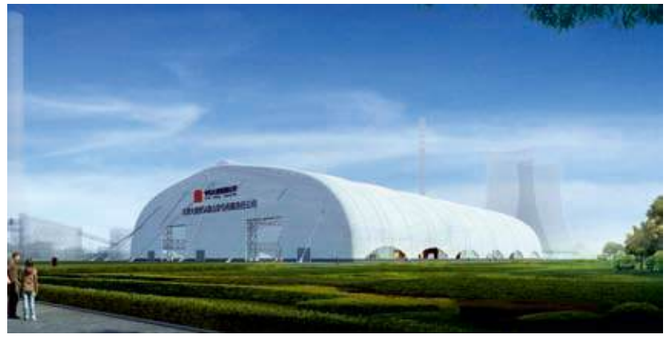
ShanghaiZhang Jiagang Bridge ▶

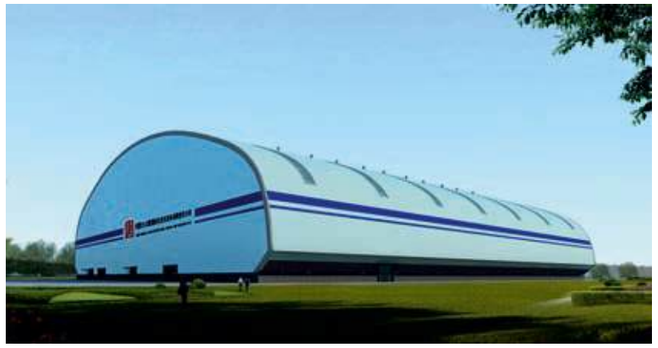
Locked coil cable: ϕ65

Projects case-coal shed

Closed Coal Yard of Tianjin Datang International Panshan Power Generation Co.,Ltd ▶

Galfan cable：Φ52、Φ71
Cast steel cable clamp





◀ Inner Mongolia Tuoketuo Power plant'Coal Shed

Galfan cable：
Φ30、Φ36、Φ40、Φ56、Φ60
Steel tension rod:
Φ30、Φ40、Φ50
Cast steel cable clamp

Clean Coal-fired Power Plant Closed Coal Yard in Haxiang,Dubai ▶

PEcable：Φ5×151
cast steel cable clamp

◀ Jiaozuo Danhe Power Plant Expansion Project

cast steel cable clamp：
Φ35、Φ45、Φ55

Projects case-other projects

◀ Beijing * National Snowmobile Center (Winter Olympic Venue)

Steel tension rod：Φ30、Φ40
Galfan cable：Φ40、Φ50、Φ60

Hong Kong Boundary Crossing Facilities Passenger Clearance Building of Hong Kong-Zhuhai -Macao Bridge ▶

Steel tension rod:
M20~M140 connector、conical column, cast support seat, cast clamp

◀ Zhu Hai Boundary Crossing Facilities Passenger Clearance Building of Hong a Bridge

cast steel cable clamp：
Φ20、Φ25、Φ30、Φ35、Φ100

Baosteel Guangdong Zhanjiang Steel Base Project Dock ▶

Dock tension rod: ϕ70

Kinex 坚宜佳
KIN LONG

Smart Home · Building Hardware

Main product series

Engineering products

- Steel Tension Cable Series
- Steel Tension Rod Series
- Cast Steel Joint
- Door Control Hardware Fittings
- Point Support Curtain Wall Fittings
- Building Anchoring

Door and window products

- Door&window Hardware Fittings
- Door&window Sealing Strip
- EPDM Sealing Strip
- TODN Door Lock Series
- Corner Sealant Series
- Forming Agent Series
- Silicon sealant
- Trenite silicon sealant
- Trenite forming agent

Auxiliary materials and tools

- Fastener
- Precision Instrument
- FLEX Electrical Tools
- Waterproof Material

Smart Home Series

- Smart Clothes Drying Rack
- Smart Door Lock
- Sanitation equipment
- Smart Peephole
- Smart dishwasher
- Smart toilet
- Electric curtains
- Water Purifier
- Sink garbage disposal
- Hagen Gnote Kitchenware series