



KINEX STEEL TENSION ROD & CABLE  
TYPICAL PRODUCTS CATALOGUE



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## Products quality control

### 1. Products implementation performance

Tension cable: The overall performance of tension cable can meet the requirement of YB/T4543-2016 *Zinc-5% Aluminum-Rare Earth Alloy Coating Steel Tension Cable for Construction Engineering*;

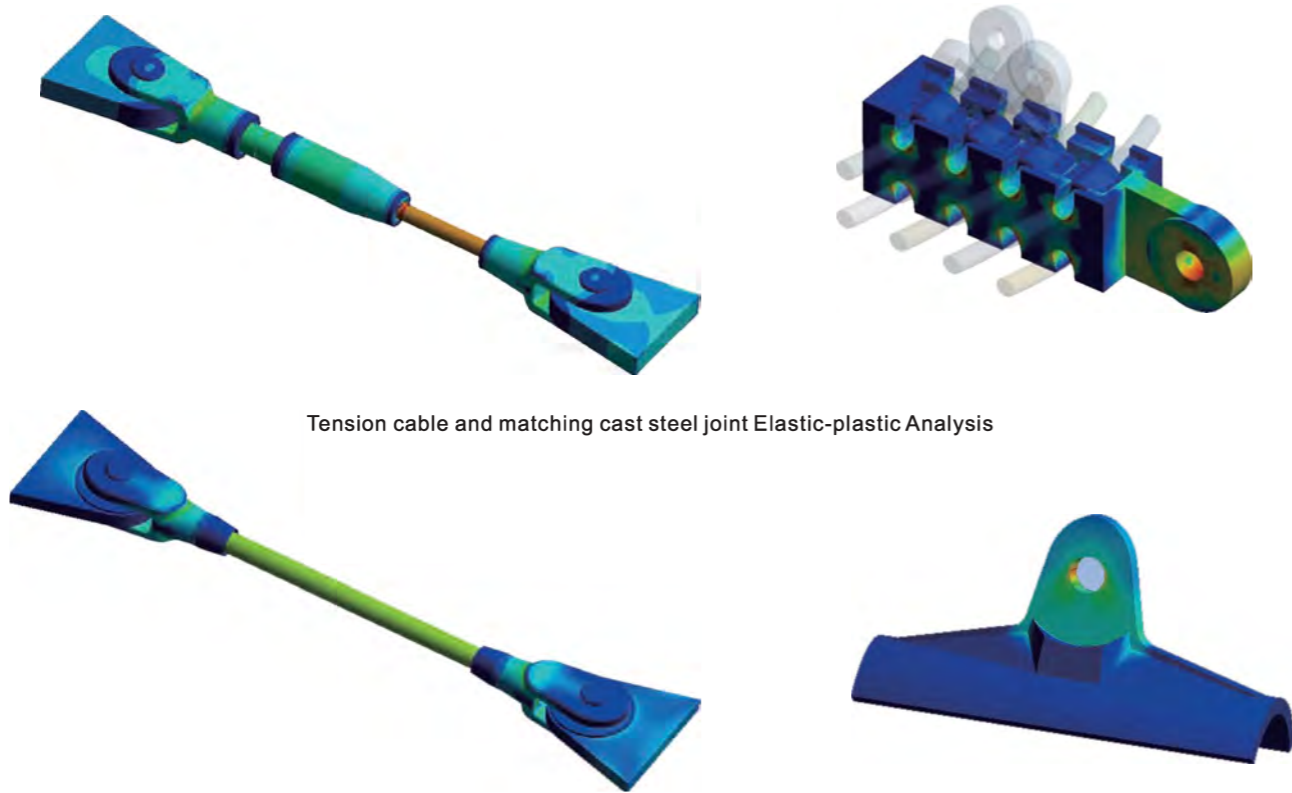
Spiral strand: Spiral strand is asked to satisfy with the requirement of YB/T4542-2016 *Zinc-5% Aluminum Rare Earth Alloy Coating Spiral Strand for Construction Engineering*;

Steel wire: The mechanical performance and coating of steel wire satisfy with the requirement of YB/T4541-2016 *Zinc-5% Aluminum Rare Earth Alloy Coating Steel Wire for Construction Engineering*;

Tension rod: The overall performance of tension rod can meet the requirement of GB/T20934-2016 *Tension Rod*.

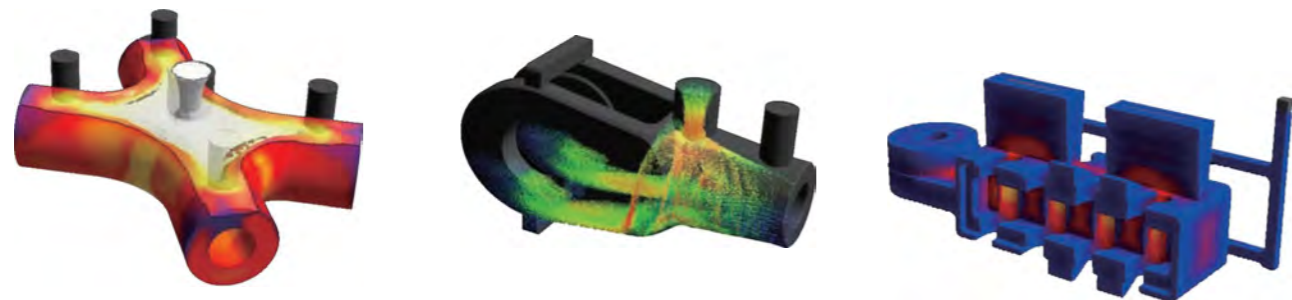
### 2. Product simulation analysis

Tension cable, tension rod and cast steel joint are the important force transferring components of building structure. In the process of product design, 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.



Tension cable and matching cast steel joint Elastic-plastic Analysis

Tension rod and matching cast steel joint Elastic-plastic Analysis



Casting finite element simulation Analysis

### 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 laboratory of Kinex has the qualification approval from CNAS. The raw material, fittings and products are all tested professionally in the laboratory, which be responsible for the quality of products.



200 Tons Vertical Tensile Machine



400 Tons Horizontal Tensile Machine



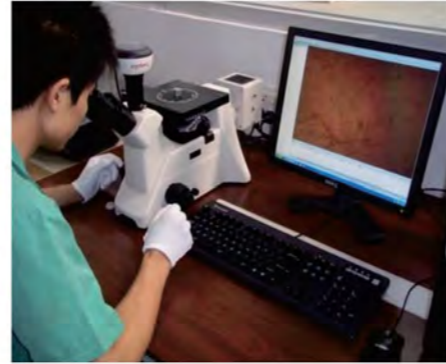
600 Tons Horizontal Tensile Machine



Direct-reading Spectrum Analyzer



Impact Testing Machine



Metallurgical Structure Analysis



High-precision hand-held spectrometer



Ultrasonic Flaw inspection



Magnetic particle inspection



Tensile Testing for Steel Wire



Torsion Testing for Steel Wire



Bending Testing for Steel Wire



Wrapping Testing for Steel Wire



Coating Quality Testing for Steel Wire

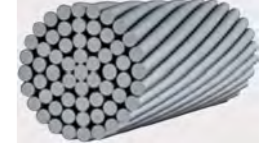
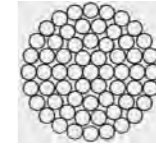


Salt Spray Testing

## Spiral Strand Product

### Spiral Strand(SS) Zinc-5% Aluminum Rare Earth Alloy Coating

Steel wire nominal strength: 1670MPa, Elastic modulus:  $(1.60 \pm 0.1) \times 10^5 \text{N/mm}^2$



Minimum Diameter of Steel Strand (mm)	Weight (kg/100m)	Effective Section Area (mm <sup>2</sup> )	Minimum Breaking Force (kN)
Φ12	70	93	140
Φ14	102	125	189
Φ16	124	153	230
Φ18	157	182	267
Φ20	193	244	359
Φ22	234	298	437
Φ24	278	352	517
Φ26	327	403	592
Φ28	379	447	656
Φ30	434	560	823
Φ32	493	600	883
Φ36	624	782	1150
Φ40	783	978	1440
Φ44	933	1160	1710
Φ48	1110	1380	2010
Φ50	1200	1510	2220
Φ55	1460	1790	2630
Φ60	1730	2110	3100
Φ65	2040	2490	3670
Φ70	2360	2930	4310
Φ75	2730	3320	4880
Φ80	3080	3770	5530
Φ85	3480	4260	6260
Φ90	3900	4900	7210
Φ95	4350	5320	7820
Φ100	4820	5990	8800
Φ105	5310	6500	9550
Φ110	5830	7180	10560
Φ115	6370	7800	11460
Φ120	6940	8490	12190
Φ125	7530	9210	13230
Φ130	8140	9960	14310
Φ135	8780	10740	15430
Φ140	9440	11620	16680

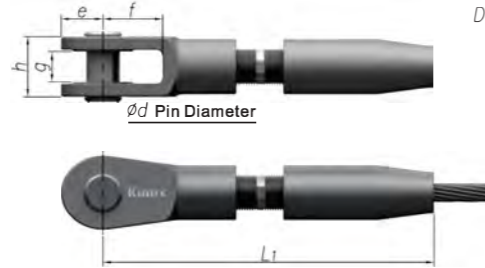
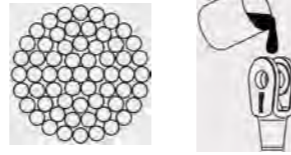
Note:

1. The reduction coefficient of the pouring tension cable is 1.0, tension cable static breaking load should over the minimum broken force 95% of spiral strand, which satisfied with YB/T4541-2016 Zinc-5% Aluminum-rare Earth Alloy Coating Steel Tension Cable for Construction Engineering.

2. The reduction coefficient of squeezed tension cable is 0.9, which satisfied with JG/T201-2007 Curtain Wall Tension Cable Squeezed Pipe Connector for Construction Engineering.

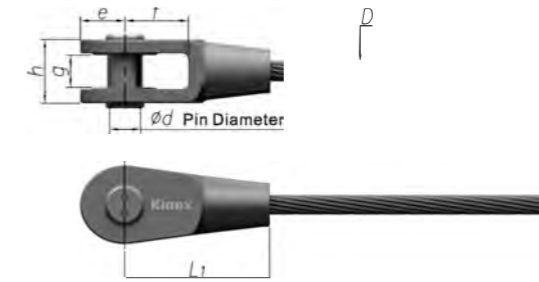
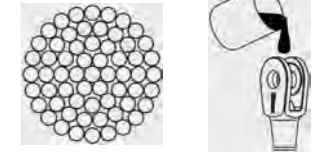
Other specifications, strength and corrosion resistance products can be provided as required.

**Adjustable Anchor with Double-ear**  
**Model: ST01**



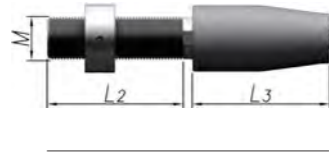
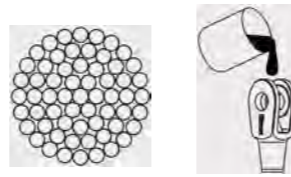
D	L1	d	g	h	e	f	
Φ20	452	33	34	68	44	60	±70
Φ22				70		65	±70
Φ24	511	42	40	80	55	70	±75
Φ26	545	44	42	84	58	75	±80
Φ28	566	47	44	88	65	80	±80
Φ30	592	54	48	94	74	90	±80
Φ32	625	58	50	98	78	100	±85
Φ36	707	63	56	114	80	105	±100
Φ40	770	77	65	130	100	130	±100
Φ44	835	83	70	146	108	140	±105
Φ48	925	95	80	160	124	160	±115
Φ50	925	95	80	160	124	160	±115
Φ55	995	103	90	180	132	175	±120
Φ60	1045	108	95	198	142	185	±120
Φ65	1115	118	105	216	150	200	±125
Φ70	1190	128	110	228	166	220	±130
Φ75	1245	138	115	240	178	235	±130
Φ80	1315	148	125	258	188	250	±135
Φ85	1375	158	130	272	202	270	±135
Φ90	1430	168	140	290	210	285	±135
Φ95	1510	178	145	304	224	300	±140
Φ100	1570	188	155	322	238	320	±140
Φ105	1625	198	160	334	250	335	±140
Φ110	1700	208	170	350	264	355	±145
Φ115	1780	218	175	365	274	370	±150
Φ120	1840	228	190	386	288	390	±150
Φ125	1885	238	195	400	298	405	±150
Φ130	1920	238	200	410	300	410	±150
Φ135	1970	248	205	424	312	420	±150
Φ140	2030	258	210	435	322	440	±150

**Fixed Anchor with Double-ear**  
**Model: SD01**



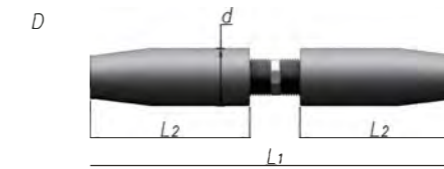
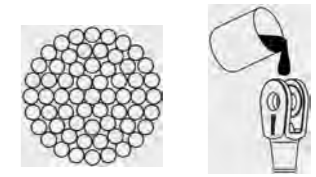
D	L1	d	g	h	e	f	
Φ20	145	33	34	68	44	60	
Φ22				70		65	
Φ24	171	42	40	80	55	70	
Φ26	184	44	42	84	58	75	
Φ28	197	47	44	88	65	80	
Φ30	215	54	48	94	74	90	
Φ32	233	58	50	98	78	100	
Φ36	254	63	56	114	80	105	
Φ40	295	77	65	130	100	130	
Φ44	325	83	70	146	108	140	
Φ48	365	95	80	160	124	160	
Φ50	365	95	80	160	124	160	
Φ55	400	103	90	180	132	175	
Φ60	430	108	95	198	142	185	
Φ65	465	118	105	216	150	200	
Φ70	505	128	110	228	166	220	
Φ75	540	138	115	240	178	235	
Φ80	575	148	125	258	188	250	
Φ85	615	158	130	272	202	270	
Φ90	650	168	140	290	210	285	
Φ95	685	178	145	304	224	300	
Φ100	725	188	155	322	238	320	
Φ105	760	198	160	334	250	335	
Φ110	800	208	170	350	264	355	
Φ115	835	218	175	365	274	370	
Φ120	875	228	190	386	288	390	
Φ125	910	238	195	400	298	405	
Φ130	935	238	200	410	300	410	
Φ135	965	248	205	424	312	420	
Φ140	1005	258	210	435	322	440	

**Adjustable Screw Anchor  
Model: SL01**



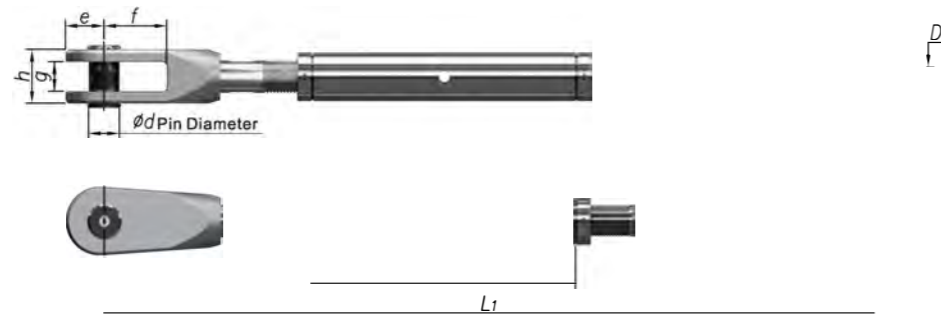
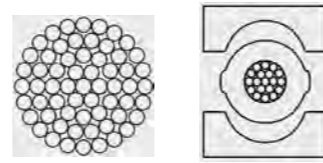
D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	M
Φ20	271	130	121	M36×4
Φ22				
Φ24	316	150	146	M45×4.5
Φ26	332	155	157	M48×5
Φ28	349	160	169	M52×5
Φ30	371	170	181	M56×5.5
Φ32	389	180	189	M56×5.5
Φ36	453	220	213	M64×6
Φ40	500	240	240	M75×6
Φ44	555	265	270	M85×6
Φ48	620	300	300	M95×6
Φ50	620	300	300	M95×6
Φ55	690	340	330	Tr105×8
Φ60	745	365	360	Tr115×8
Φ65	780	370	390	Tr125×8
Φ70	825	380	415	Tr130×8
Φ75	880	405	445	Tr140×8
Φ80	910	405	475	Tr150×10
Φ85	960	425	505	Tr160×10
Φ90	1005	440	535	Tr170×10
Φ95	1050	445	565	Tr180×10
Φ100	1105	470	595	Tr190×10
Φ105	1150	485	625	Tr200×12
Φ110	1190	495	655	Tr210×12
Φ115	1245	510	685	Tr220×12
Φ120	1315	550	715	Tr230×12
Φ125	1370	580	740	Tr235×12
Φ130	1415	600	765	Tr240×12
Φ135	1445	600	795	Tr250×12
Φ140	1485	610	825	Tr260×12

**Ringy Cable Anchor with Adjustable Screw Rod  
Model: SH01**

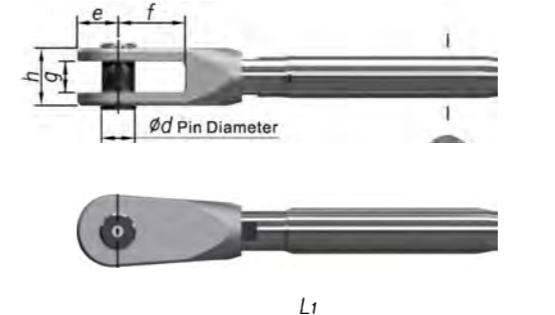
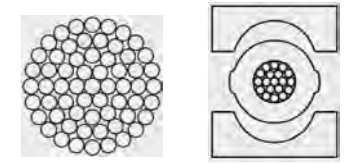


D	L <sub>1</sub>	L <sub>2</sub>	d	Unilateral Remaining Distance
Φ20	472	191	56	±70
Φ22				±70
Φ24	537	221	70	±75
Φ26	574	237	74	±80
Φ28	598	249	78	±80
Φ30	622	261	82	±80
Φ32	653	274	86	±85
Φ36	746	313	100	±100
Φ40	800	340	116	±100
Φ44	875	375	130	±105
Φ48	965	415	144	±115
Φ50	965	415	144	±115
Φ55	1040	450	160	±120
Φ60	1100	480	174	±120
Φ65	1175	515	188	±125
Φ70	1250	545	198	±130
Φ75	1310	575	212	±130
Φ80	1385	610	226	±135
Φ85	1445	640	242	±135
Φ90	1505	670	255	±135
Φ95	1590	705	270	±140
Φ100	1650	735	285	±140
Φ105	1710	765	298	±140
Φ110	1785	800	312	±140
Φ115	1870	835	326	±145
Φ120	1930	865	340	±150
Φ125	1980	890	352	±150
Φ130	2030	915	358	±150
Φ135	2090	945	372	±150
Φ140	2150	975	385	±150

**Adjustable Anchor with Double-ear**  
Model:YT01



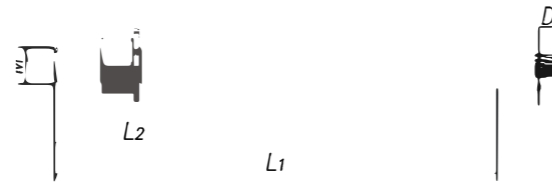
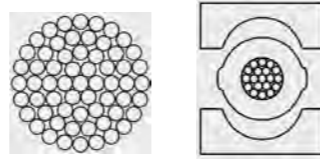
**Fixed Anchor with Double-ear**  
Model: YD01



D	L <sub>1</sub>	L <sub>2</sub>	d	g	h	e	f	Unilateral regulating variable
Φ12	530	200	19.5	18	35	26	40	±60
Φ14	585	220	22.5	20	35	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

D	L <sub>1</sub>	d	g	h	e	f
Φ12	225	19.5	18	35	26	40
	255	22.5				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**  
Model: YL02

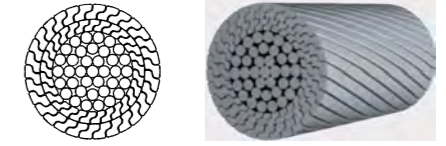


D	L <sub>1</sub>	L <sub>2</sub>	M
Φ12	255	105	M24±3
Φ14	285	115	M27±3
Φ16	320	125	M30±3.5
Φ18	345	130	M33±3.5
Φ20	380	145	M36±4
Φ22	410	155	M39±4
Φ24	450	165	M45±4.5
Φ26	480	175	M48±5
Φ28	510	185	M52±5
Φ30	540	195	M52Y5

**Locked Coil Strand**

**Locked Coil Strand(LC)**  
Zinc-5% Aluminum Rare Earth Alloy Coating

Elastic modulus:  $(1.65 \pm 0.1) \times 10^5 \text{N/mm}^2$

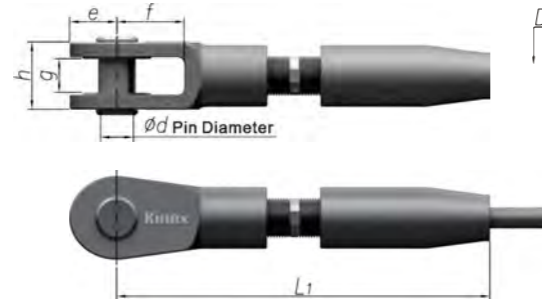
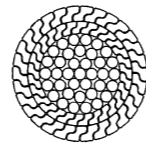


Nominal Diameter of Steel Strand (mm)	Weight (kg/10m)	Effective Section Area of Steel Strand (mm <sup>2</sup> )	Minimum Breaking Force of Steel Strand (kN)
Φ40	876	1090	1580
Φ45	1110	1390	2000
Φ50	1370	1710	2470
Φ55	1680	2090	3020
Φ60	2000	2490	3590
Φ65	2350	2920	4220
Φ70	2720	3390	4890
Φ75	3130	3890	5620
Φ80	3550	4420	6390
Φ85	4010	5000	7220
Φ90	4500	5600	8090
Φ95	5070	6310	9120
Φ100	5620	6990	10100
Φ105	6190	7710	11100
Φ110	6800	8460	12200
Φ115	7450	9280	13300
Φ120	8110	10100	14500
Φ125	8840	11000	15700
Φ130	9560	11900	16200
Φ135	10400	12920	17500
Φ140	11200	13900	18700

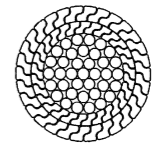
Implementing Standards: EN12385-10(Steel wire ropes-Safety-Part 10Spiral ropes for general structural applications)

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

**Adjustable Anchor with Double-ear  
Model:LT01**



**Fixed Anchor with Double-ear  
Model: LD01**

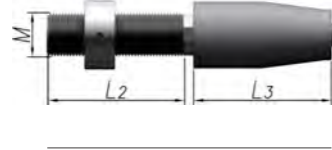
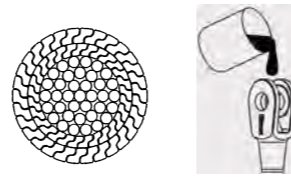


D	L <sub>1</sub>	d	g	h	e	f	
Φ40	770	77	65	130	100	130	±100
Φ45	835		70	146	108	140	±105
Φ50	925	95	80	160	124	160	±115
Φ55	995	103	90	180	132	175	±120
Φ60	1045	108	95	198	142	185	±120
Φ65	1115	118	105	216	150	200	±125
Φ70	1190	128	110	228	166	220	±130
Φ75	1245	138	115	240	178	235	±130
Φ80	1315	148	125	258	188	250	±135
Φ85	1375	158	130	272	202	270	±135
Φ90	1430	168	140	290	210	285	±135
Φ95	1510	178	145	304	224	300	±140
Φ100	1570	188	155	322	238	320	±140
Φ105	1625	198	160	334	250	335	±140
Φ110	1700	208	170	350	264	355	±145
Φ115	1780	218	175	365	274	370	±150
Φ120	1840	228	190	386	288	390	±150
Φ125	1885	238	195	400	298	405	±150
Φ130	1920	238	200	410	300	410	±150
Φ135	1970	248	205	424	312	420	±150
Φ140	2030	258	210	435	322	440	±150

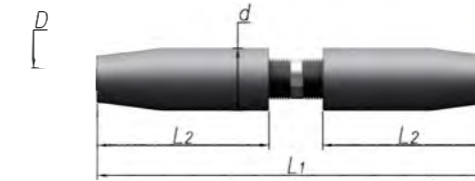
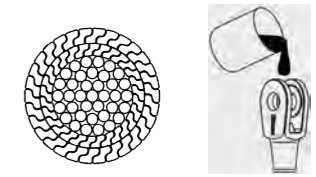
D	L <sub>1</sub>	d	g	h	e	f	
Φ40	295	77	65	130	100	130	
Φ45	325		70	146	108	140	
Φ50	365	95	80	160	124	160	
Φ55	400	103	90	180	132	175	
Φ60	430	108	95	198	142	185	
Φ65	465	118	105	216	150	200	
Φ70	505	128	110	228	166	220	
Φ75	540	138	115	240	178	235	
Φ80	575	148	125	258	188	250	
Φ85	615	158	130	272	202	270	
Φ90	650	168	140	290	210	285	
Φ95	685	178	145	304	224	300	
Φ100	725	188	155	322	238	320	
Φ105	760	198	160	334	250	335	
Φ110	800	208	170	350	264	355	
Φ115	835	218	175	365	274	370	
Φ120	875	228	190	386	288	390	
Φ125	910	238	195	400	298	405	
Φ130	935	238	200	410	300	410	
Φ135	965	248	205	424	312	420	
Φ140	1005	258	210	435	322	440	



**Adjustable Screw Anchor  
Model: LL01**



**Ringy Cable Anchor with Adjustable Screw Rod  
Model: LH01**



D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	M
Φ40	500	240	240	M75×6
Φ45	555	265	270	M85×6
Φ50	620	300	300	M95×6
Φ55	690	340	330	Tr105×8
Φ60	745	365	360	Tr115×8
Φ65	780	370	390	Tr125×8
Φ70	825	380	415	Tr130×8
Φ75	880	405	445	Tr140×8
Φ80	910	405	475	Tr150×10
Φ85	960	425	505	Tr160×10
Φ90	1005	440	535	Tr170×10
Φ95	1050	445	565	Tr180×10
Φ100	1105	470	595	Tr190×10
Φ105	1150	485	625	Tr200×12
Φ110	1190	495	655	Tr210×12
Φ115	1245	510	685	Tr220×12
Φ120	1315	550	715	Tr230×12
Φ125	1370	580	740	Tr235×12
Φ130	1415	600	765	Tr240×12
Φ135	1445	600	795	Tr250×12
Φ140	1485	610	825	Tr260×12

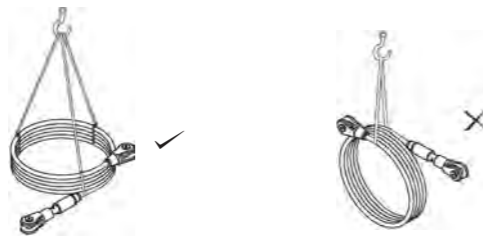
D	L <sub>1</sub>	L <sub>2</sub>	d	Unilateral Allowable Displacement
Φ40	800	340	116	±100
Φ45	875	375	130	±105
Φ50	965	415	144	±115
Φ55	1040	450	160	±120
Φ60	1100	480	174	±120
Φ65	1175	515	188	±125
Φ70	1250	545	198	±130
Φ75	1310	575	212	±130
Φ80	1385	610	226	±135
Φ85	1445	640	242	±135
Φ90	1505	670	255	±135
Φ95	1590	705	270	±140
Φ100	1650	735	285	±140
Φ105	1710	765	298	±140
Φ110	1785	800	312	±145
Φ115	1870	835	326	±150
Φ120	1930	865	340	±150
Φ125	1980	890	352	±150
Φ130	2030	915	358	±150
Φ135	2090	945	372	±150
Φ140	2150	975	385	±150

## Order Instructions of Tension Cable

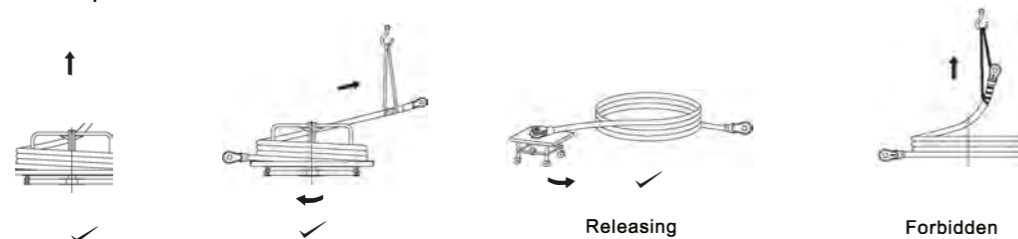
1. Please select the proper tension cable according to construction site, and inform us the length of L (distance of pin to pin). Please describe clearly if the length L be requested with or without the stress state. Meanwhile please offer the prestress value of cables on construction process.
2. Please considering the temperature influences on the cable length according to the construction site situation. Our cable length is measured under the temperature 10°C-25°C.
3. The surface treatment of the cable anchor includes the zinc-rich epoxy prime, fluorocarbon coating, etc. Considering there will be the integral anticorrosion and final surface treatment after the adjusting installation, we suggest choosing the zinc-rich epoxy prime as the producing treatment. Please offer the corresponding color card if the fluorocarbon coating be requested.

## Instructions of the Tension Cable

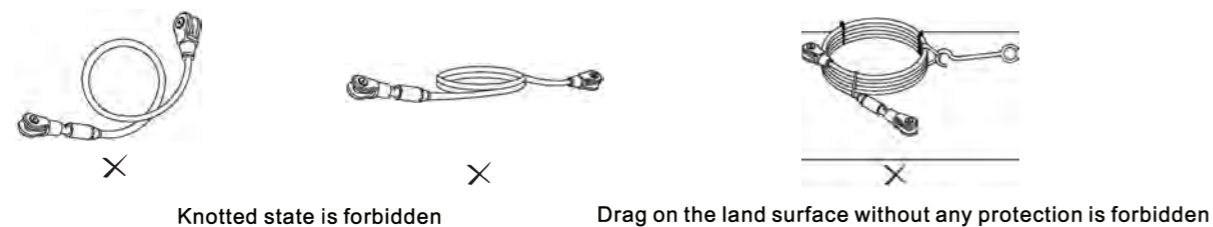
1. During the transport, the both anchors of a tension cable must be fixed when using the soft package.
2. The tension cables must be put on a clean plate and clean place after they be shipped to the construction site. The tension cables with cable plate must be as integral set to be put out. The tension cables must be stored in a dry, clean and ventilated warehouse when there is no installation schedule.



3. On the construction site, the tension cables must be rotated released along its spooling direction and be operated on the cable plate. The vertical lifting is forbidden before the release. During the lifting process, the both anchors must be properly protected to avoid the scratch and bump.



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 drag on the land surface without any protection and be placed arbitrarily.



5. In order to protect the cable body from scratched, it need to avoid friction and bump 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 discarding.

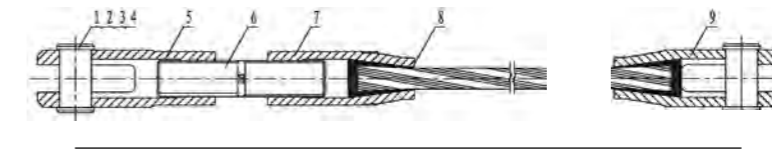
6. The producing surface treatment of cable anchor is thermal spraying zinc with zinc-rich epoxy primer, which is the basic anti-corrosion treatment. There should be the integral anticorrosion treatment after the stretching installation.

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 100µm.

8. When packaging, for the tension cable with diameter  $\varnothing 80\text{mm}$ , 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 enough care, 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 main 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 procession must be stop 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 require.

## 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( $\Phi 20\sim\Phi 130$ ), 1100 grade( $\Phi 20\sim\Phi 80$ ). Clients can select accordingly.



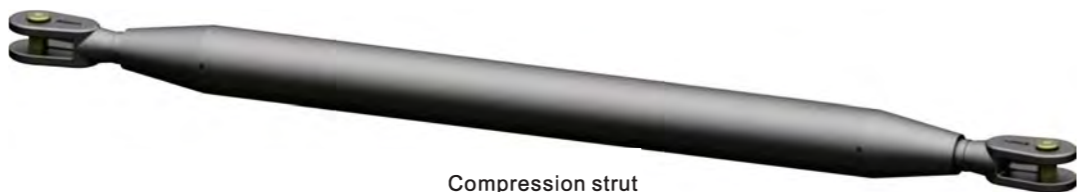
Architecture and bridge tension rod system



Shipbuilding yard and seaport tension rod system



High strength anchoring tension rod system



Compression strut

## Products quality control

### I. 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.

### II. 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 resistance system: Epoxy zinc rich primer + Epoxy MIO intermediate coat + Polyurethane top coat;
3. Anti-fire 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 easily;
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



Polyurethane paint



Fluorocarbon coating



Hot dip galvanized



Zinc-plated



Fireproof coating



# Steel Tension Rod Classification

Type	Code	Name	Form	
Arch tecture and Bridge Tens on Rod System	Non-equal Strength Tension Rod Series	LG04	Spiro Union & Binaural (preload) Tension Rod	
		LG04T	Spiro Union & Binaural(preload) Tension Rod(with couplers)	
		LG05	Spiro Union & Monaural (preload) Tension Rod	
		LG05T	Spiro Union & Binaural(preload) Tension Rod(with couplers)	
		LG06	Forged Monaural Tension Rod	
		LG06T	Forged Monaural Tension Rod (with couplers)	
		LJT03	Central Connector	
	Equal Strength Tension Rod Series	LG01	Spiro Union & Binaural (preload) Tension Rod	
		LG01T	Spiro Union & Binaural(preload) Tension Rod(with couplers)	
		LG02	Spiro Union & Monaural (preload) Tension Rod	
		LG02T	Spiro Union & Binaural(preload) Tension Rod(with couplers)	
		LG03	Forged Monaural Tension Rod	
		LG03T	Forged Monaural Tension Rod (with couplers)	
	Steel Strut Series	YG01	Compression Strut	
Membrane Structure Series	MLG01	Membrane 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		

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

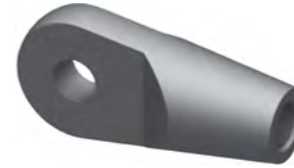
## Illustration for Standard Fittings

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:



### Double-ear 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 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. Double-ear anchor is the most commonly used structure in projects. The pin set will be supplied by us.



### Single-ear 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. Single-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.



### Pin Set

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 and fork eye as well as the requirement of corrosion resistance, colored galvanization is applied to finish of our pin and pin cover.



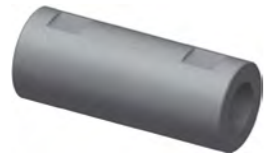
Colored Galvanized Pin



### Locking Nut

Locking nut is conical. Its main function is to lock the fork end and tension rod, preventing loose. A certain 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

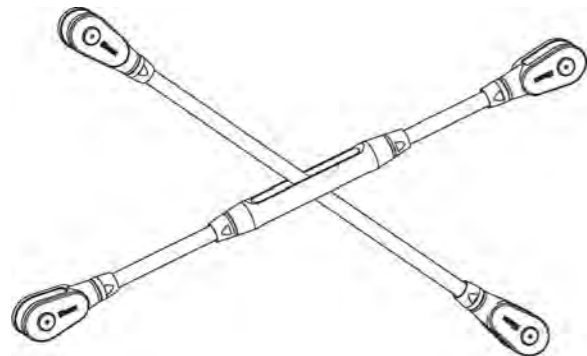


Adjusting sleeve is a threaded pipe connector and is used to extend the length of tension rod. It can be used anywhere in the middle of tension rod. The adjuster itself also is adjustable and can improve the adjustability of tension rod to offset the structure deviation and requirement of tensioning.

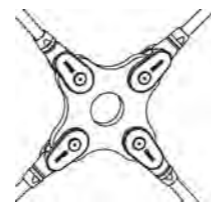
### Hollow Spindle-shaped Adjusting Sleeve



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 non-uniform strength series tension rod with diameter ranging from §16mm to §50mm.



Application Illustration of Hollow Spindle-shaped Adjusting Sleeve



Application Illustration of Plate Connecting

### Basic Information for Ordering Standard Fittings

1. Please provide steel tension rod specification, 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  $\Phi 40\text{mm}$ , the code is LG04A-40;
  - b. If client order equal strength tension rod with eye end and connector, strength grade is A, diameter is  $\Phi 60\text{mm}$ , the code is LG02TB-60;
4. If nonstandard tension rod is needed, please contact KINEX Technical Department.

### Smart Steel Tension Rod

Steel 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 affects 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 phase. The dynamometer method of steel rod normally adopt torque coefficient method or hydraulic conversion method, but the measurement results will be affected 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 line.



Handheld Tensometer



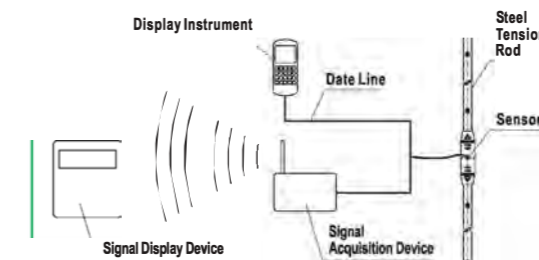
Wireless Communication Devices

### 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 steel tension rod, connecting signal acquisition device and the intelligent link data line. 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.



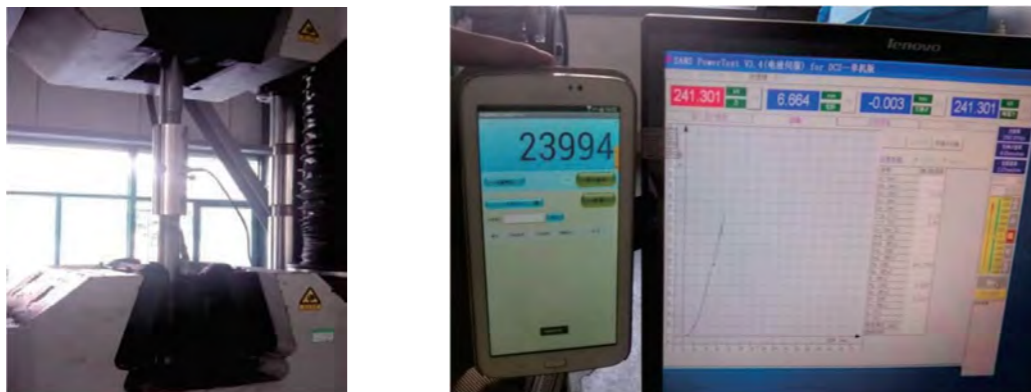
Schematic Diagram of Working Principle

## Products quality control

### 1. The Dynamometric Progress of Smart Steel Rod

①Put high-precision sensor in the steel rod accessories → ②calibrate tensometer → ③install the steel rod → ④site dynamometric testing

①②are implemented in the factory, ③④are implemented on the construction site.



The accuracy can reach more than 95% after repeated testing. The invention 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	Nominal Diameter (mm)	Yield Strength $R_{eL}$ (N/mm <sup>2</sup> )	Tensile Strength $R_m$ (N/mm <sup>2</sup> )	Elongation A(%)
			≥		
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	Nominal Diameter (mm)	Yield Strength $R_{eL}$ (N/mm <sup>2</sup> )	Tensile Strength $R_m$ (N/mm <sup>2</sup> )	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 (mm)	Rod Effective Sectional Area (mm <sup>2</sup> )	Theoretical Load(kN)				Rod Diameter (mm)	Rod Effective Sectional Area (mm <sup>2</sup> )	Theoretical Load(kN)			
		Yield Load	Break Load	Yield Load	Break Load			850 Grade	1100 Grade	Yield Load	Break Load
		266	329	345	386			5277	5528	6181	
25		416	514	539	602	85	5674	5957			
30	706	600	741	776	868	90	6361	5406	6679		
35	962	817	1010	1058	1183	95	7088	6024	7442		
40	1256	1067	1318	1381	1544	100	7853	6675	8245		
45	1590	1351	1669	1749	1955	105	8659	7360	9091		
50	1963	1668	2061	2159	2414	110	9503	8077	9978		
55	2375	2018	2493	2612	2921	115	10386	8828	10905		
60	2827	2402	2968	3109	3477	120	11309	9612	11874		
65	3318	2820	3483	3649	4081	125	12271	10430	12884		
70	3848	3270	4040	4232	4733	130	13273	11282	13936		
75	4417	3754	4637	4858	5432						

## Non-equal Strength Steel Tension Rod Mechanical Property

Rod Diameter Φ(mm)	Rod Effective Sectional Area (mm <sup>2</sup> )	Grade 35		Grade 45		Grade 55		Grade 65		Grade 75	
		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 Strength x Effective Sectional Area  
Theoretical Break Load=Tensile Strength x Effective Sectional Area

## Equal Strength Steel Tension Rod Mechanical Property

Rod Diameter Φ(mm)	Rod Effective Sectional Area (mm <sup>2</sup> )	Grade 35		Grade 45		Grade 55		Grade 65		Grade 75	
		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

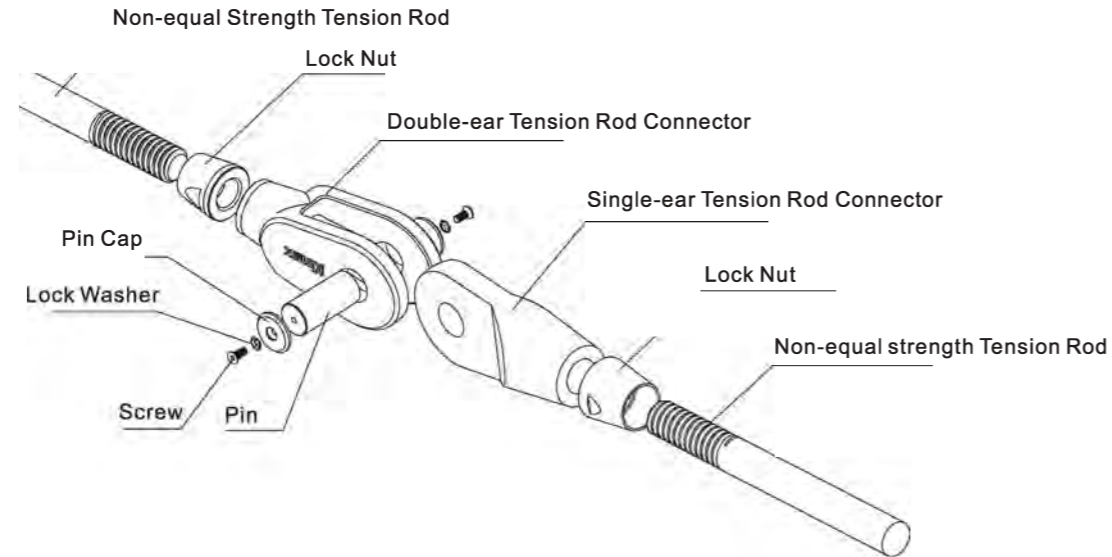
Note: Refer to the provision shown in JGJ 257-2012 *Cable Structure Technical Specification*, the designed value of loading capacity of steel tension rod is breaking load value divided by 1.7  
Customers can choose appropriate steel tension rod according to above mentioned parameters

## Architecture and Bridge Tension Rod System

### Non-equal Strength Tension Rod Series

Non-equal strength tension rods apply non-equal-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.

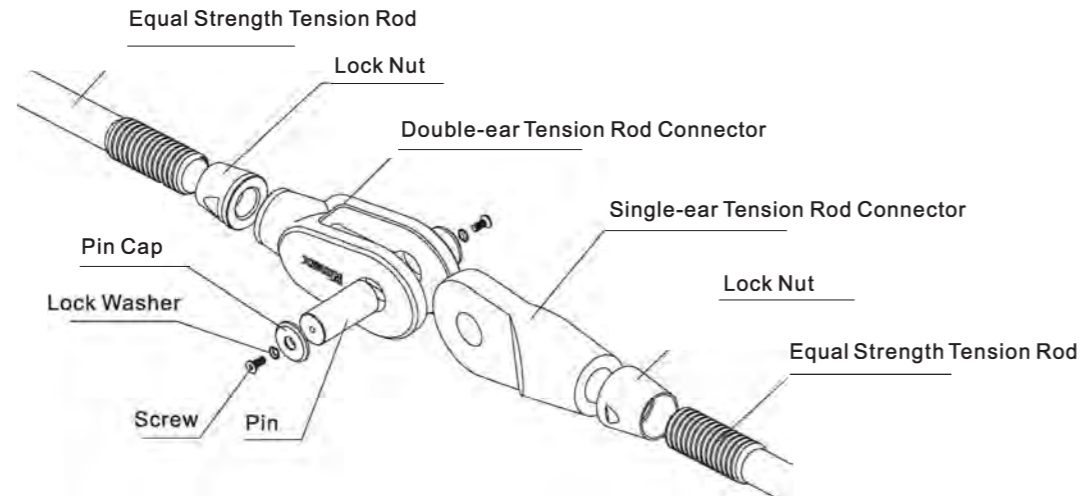
Non-equal strength tension rod is convenient to produce and has shorter lead time.



### Equal 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 is, the more obvious the advantage is.

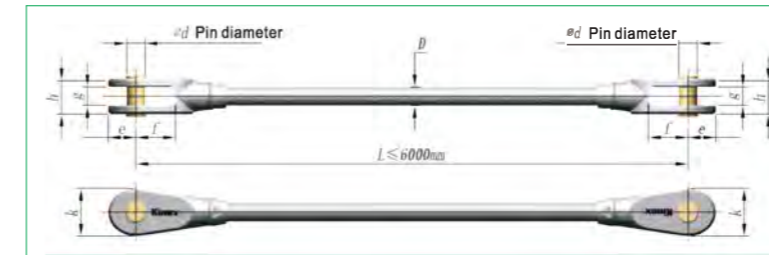


## Architecture and Bridge Tension Rod System

### Spiro Union Tension Rod with Double Ear & Adjustable Sleeve ModelJLG01(Equal Strength)/LG04(Non-equal Strength)



### Parameter Table of Spiro Union Tension Rod(Φ16~Φ115) with Double Ear



### 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 steel tension rod or regulating distance.

Rod Diameter (mm)	Thread Specification		e	f	g	h	d	k	Tolerance (mm)
	Equal Strength(LG01)	Non-equal 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

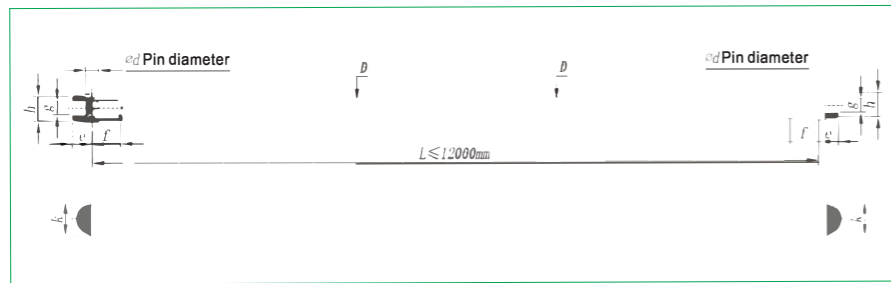


## Architecture and Bridge Tension Rod System

**Spiro Union Tension Rod with Double Ear & Adjustable Sleeve**  
**ModelJLG01T(Equal Strength)/LG04E(Non-equal Strength)**



**Parameter Table of Spiro Union Tension Rod(Φ120~Φ250) with Double Ear**



**Model Instruction:**  
**LG01X-X(LG04X-X)**

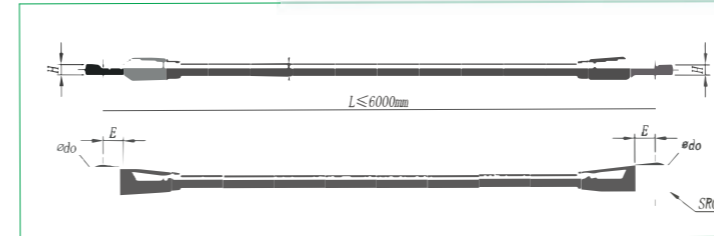
Rod Diameter  
 Strength Grade  
 (A, B, C, D, E)

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		f	g	h	d	k	Single Side Adjustment Capacity	
	Equal-Strength(LG01)	M							
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

## Architecture and Bridge Tension Rod System

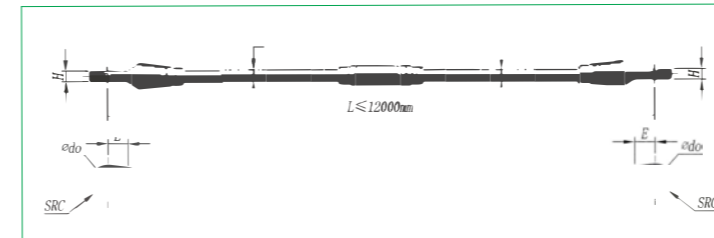
**Spiro Union Tension Rod with Single Ear**  
**ModelJLG02(Equal Strength)/LG05(Non-equal Strength)**



**Model Instruction:**  
**LG02X-X(LG05X-X)**

Rod Diameter  
 Strength Grade  
 (A, B, C, D, E)

**Spiro Union Tension Rod with Single Ear & Adjustable Sleeve**  
**ModelJLG02T(Equal Strength)/LG05T(Non-equal Strength)**



**Model Instruction:**  
**LG01TX-X(LG04TX-X)**

Rod Diameter  
 Strength Grade  
 (A, B, C, D, E)

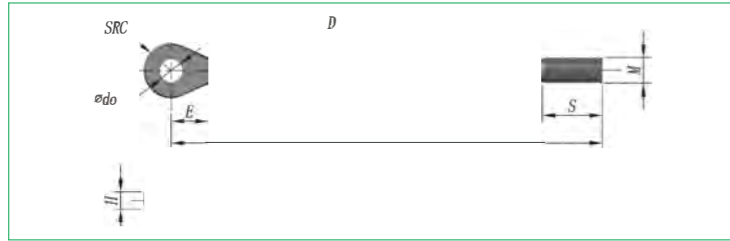
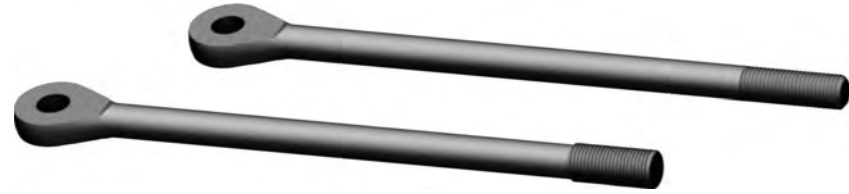
This the first letter of Chinese Phonetic Alphabet of adjustable sleeve

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		do	Single Side Adjustment Capacity	Rod Diameter (D)	Thread Specification		do	Single Side Adjustment Capacity						
	Equal-Strength(LG02)	Non-equal-Strength(LG05)				Equal-Strength(LG02)	Non-equal-Strength(LG05)								
Φ16	M20x2.5	M16x2	24	30	14	16	±10	Φ85	M95x6	M85x6	110	125	80	85	±22
Φ20	M24x3	M20x2.5	30	38	16	20	±10	Φ90	M100x6	M90x6	117	137	83	90	±22
Φ25	M30x3.5	M25x3	37	45	20	25	±10	Φ95	M105x6	M95x6	125	145	87	95	±24
Φ30	M36x4	M30x3.5	44	52	23	30	±12	Φ100	M110x6	M100x6	130	150	92	100	±24
Φ35	M39x4	M35x4	50	58	28	35	±13	Φ105	M115x6	M105x6	137	157	97	105	±25
Φ40	M45x4.5	M40x4	57	65	33	40	±13	Φ110	M120x6	M110x6	143	168	102	110	±28
Φ45	M52x5	M45x4.5	63	71	38	45	±14	Φ115	Tr125x6	M112x6	150	175	107	115	±28
Φ50	M56x5.5	M50x5	70	78	42	50	±17	Φ120	Tr130x6	M118x6	155	180	112	120	±28
Φ55	M64x6	M55x5.5	75	85	47	55	±17	Φ125	Tr135x6	Tr122x6	160	187	115	125	±30
Φ60	M68x6	M60x5.5	85	90	52	60	±17	Φ130	Tr140x6	Tr125x6	165	205	120	130	±30
Φ65	M72x6	M65x6	87	97	58	65	±20	Φ135	Tr145x6	Tr130x6	170	214	125	135	±30
Φ70	M80x6	M70x6	93	106	62	70	±20	Φ140	Tr150x6	Tr135x6	175	222	130	140	±35
Φ75	M85x6	M75x6	102	117	65	75	±20	Φ145	Tr155x6	Tr140x6	180	228	135	145	±35
Φ80	M90x6	M80x6	108	123	70	80	±20	Φ150	Tr160x6	Tr145x6	185	234	140	150	±35

## Architecture and Bridge Tension Rod System

**Forged Tension Rod with Single Ear**  
**ModelJLG03(Equal Strength)/LG06(Non-equal Strength)**



**Model Instruction:**  
**LG03X-X(LG06X-X)**

Rod Diameter  
 Strength Grade  
 (A, B, C, D, E)

## Architecture and Bridge Tension Rod System

**Hollow Spindle-shaped Adjustable Sleeve**  
**ModelJLJT03**

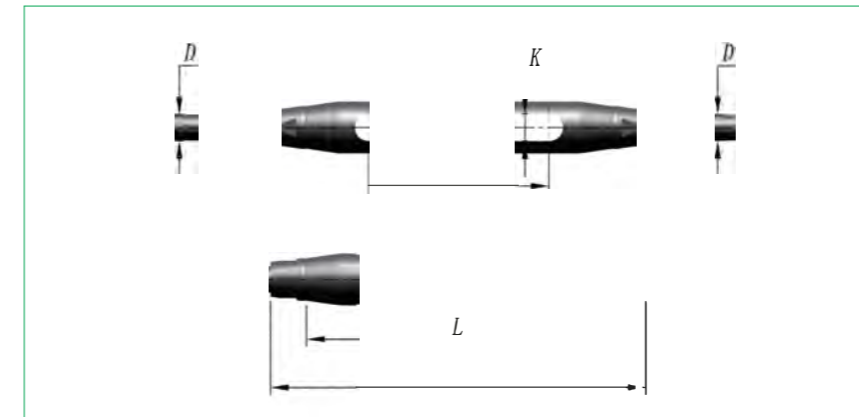


**Forged Tension Rod with Single Ear & Adjustable Sleeve**  
**ModelJLG03T(Equal Strength)/LG06T(Non-equal Strength)**



**Model Instruction:**  
**LG03TX-X(LG06TX-X)**

Rod Diameter  
 Strength Grade  
 (A, B, C, D, E)  
 This the first letter of  
 Chinese Phonetic  
 Alphabet of adjustable  
 sleeve



**Model Instruction:**  
**LJT03X-X**

Rod Diameter  
 Strength Grade  
 (A, B, C, D, E)

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

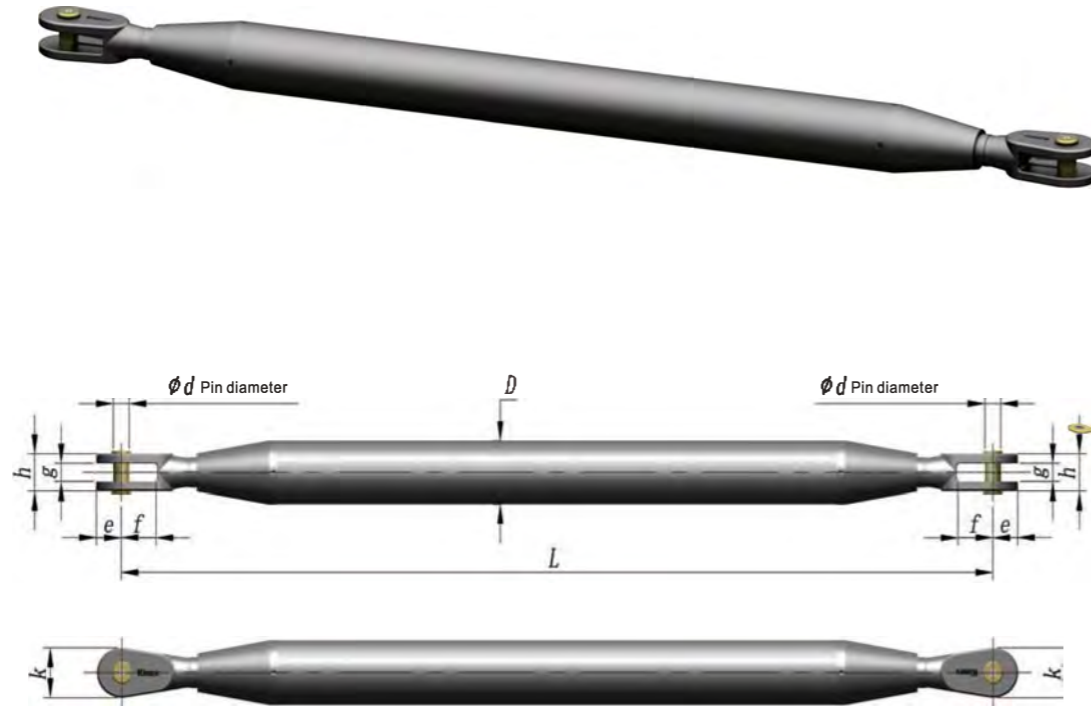
Rod Diameter (D)	Equal Strength(LG03)		Non-equal Strength(LG06)		do	Single Side Adjustment Capacity	Rod Diameter (D)	Equal Strength(LG03)		Non-equal Strength(LG06)		do	Single Side Adjustment Capacity				
	Equal Strength(LG03)	Non-equal Strength(LG06)	Equal Strength(LG03)	Non-equal Strength(LG06)				Equal Strength(LG03)	Non-equal Strength(LG06)								
Φ16	M20x2.5	M16x2	19	25	12	57	16	±10	Φ85	M95x6	M85x6	101	136	64	188	85	±22
Φ20	M24x3	M20x2.5	24	32	15	63	20	±10	Φ90	M100x6	M90x6	107	144	68	195	90	±22
Φ25	M30x3.5	M25x3	30	40	19	72	25	±10	Φ95	M105x6	M95x6	112	150	72	206	95	±24
Φ30	M36x4	M30x3.5	36	48	23	88	30	±12	Φ100	M110x6	M100x6	119	160	75	215	100	±24
Φ35	M39x4	M35x4	41	55	27	95	35	±13	Φ105	M115x6	M105x6	124	166	79	225	105	±25
Φ40	M45x4.5	M40x4	48	65	30	102	40	±13	Φ110	M120x6	M110x6	130	174	83	237	110	±28
Φ45	M52x5	M45x4.5	54	73	34	110	45	±14	Φ115	Tr125x6	M112x6	136	182	87	245	115	±28
Φ50	M56x5.5	M50x5	59	79	38	123	50	±17	Φ120	Tr130x6	M118x6	142	190	90	242	120	±28
Φ55	M64x6	M55x5.5	65	87	42	135	55	±17	Φ125	Tr135x6	Tr122x6	152	196	96	254	125	±30
Φ60	M68x6	M60x5.5	72	97	45	140	60	±17	Φ130	Tr140x6	Tr125x6	162	202	100	260	130	±30
Φ65	M72x6	M65x6	77	103	49	150	65	±20	Φ135	Tr145x6	Tr130x6	172	210	104	274	135	±30
Φ70	M80x6	M70x6	83	111	53	155	70	±20	Φ140	Tr150x6	Tr135x6	182	218	108	283	140	±35
Φ75	M85x6	M75x6	89	120	57	169	75	±20	Φ145	Tr155x6	Tr140x6	192	224	112	289	145	±35
Φ80	M90x6	M80x6	95	127	60	176	80	±20	Φ150	Tr160x6	Tr145x6	202	230	116	295	150	±35

## Hollow Spindle-shaped Adjustable Sleeve

Rod Diameter (D)	Thread Specification	K	L	L <sub>1</sub>	L <sub>2</sub>	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

## Architecture and Bridge Tension Rod System

**Compression Strut  
ModelJYG01**



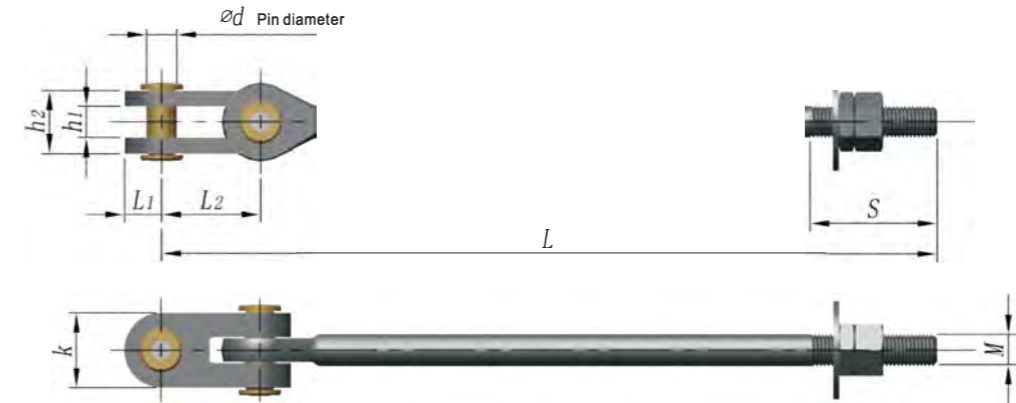
Note: Verify the calculation of compression strut overall compressive bearing capacity according to project actual condition.

Model	Compression Rod 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.

## Architecture and Bridge Tension Rod System

**Membrane Structure Tension Rod  
ModelJMLG01**



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

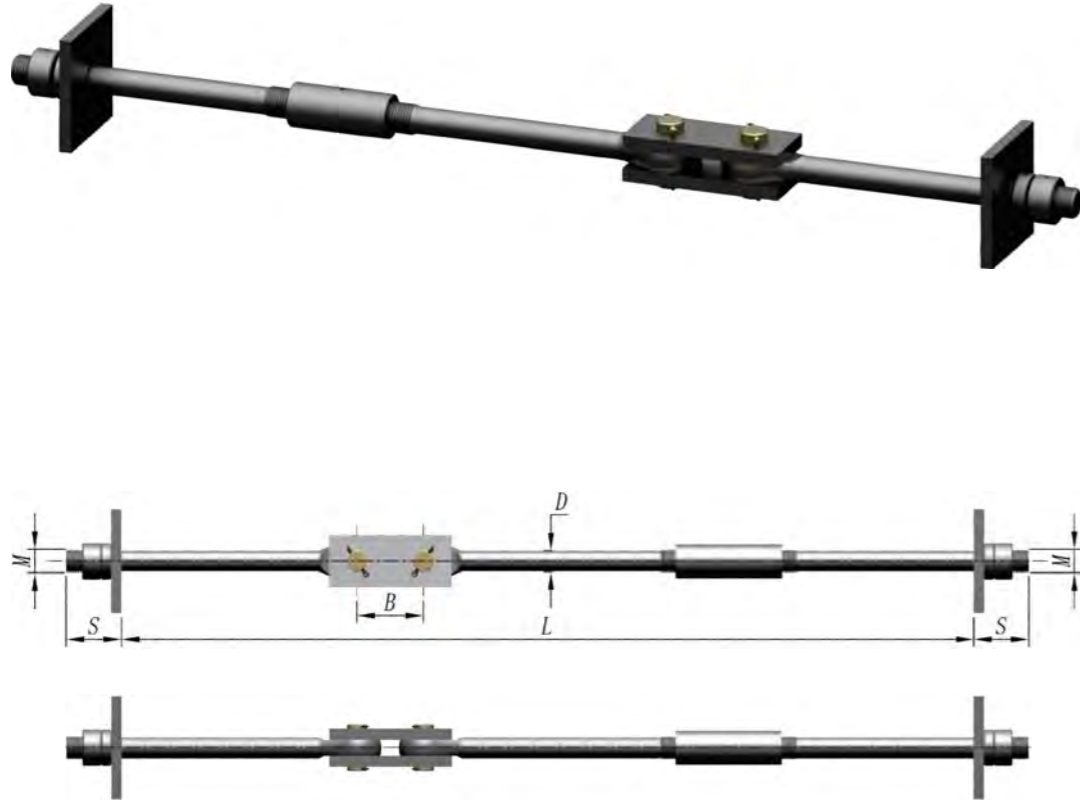
Rod Diameter (D)	Thread Specification	L <sub>1</sub>	L <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	k	d	s
Φ12	M12x1.5	15	43	13	29	30	12	40
Φ16	M16x2	18	53	17	35	36	15.5	53
Φ20	M20x2.5	22	68	20	44	44	19.5	59
Φ25	M25x3	27	85	26	54	54	24.5	66
Φ30	M30x3.5	32.5	97	31	65	65	29.5	81

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  
ModelJCLG

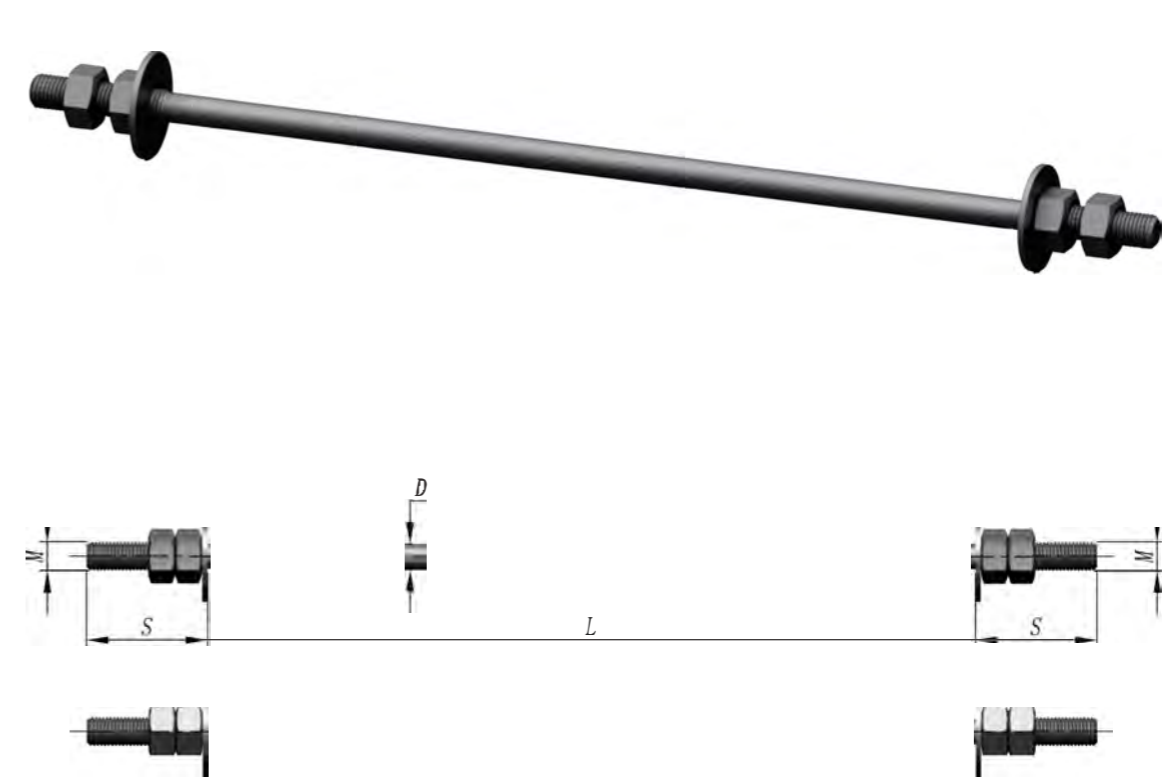


Note: The quantity of adjustable sleeve can be finalized according to the length of steel tension rod or regulating distance.

Rod Diameter (D)	Thread Specification	S	B	Unilateral Adjusting Variable	Rod Diameter (D)	Thread Specification	S	B	Unilateral Adjusting Variable
Φ40	M45x4.5	102	130	±50	Φ100	M110x6	215	300	±90
Φ45	M52x5	110	140	±50	Φ105	M115x6	225	320	±90
Φ50	M56x5.5	123	150	±50	Φ110	M120x6	237	320	±90
Φ55	M64x6	135	160	±60	Φ115	Tr125x6	245	340	±100
Φ60	M68x6	140	180	±60	Φ120	Tr130x6	242	360	±100
Φ65	M72x6	150	200	±70	Φ125	Tr135x6	254	380	±100
Φ70	M80x6	155	220	±70	Φ130	Tr140x6	260	400	±100
Φ75	M85x6	169	240	±80	Φ135	Tr145x6	274	420	±100
Φ80	M90x6	176	250	±80	Φ140	Tr150x6	283	440	±100
Φ85	M95x6	188	270	±90	Φ145	Tr155x6	289	460	±100
Φ90	M100x6	195	290	±90	Φ150	Tr160x6	295	480	±100
Φ95	M105x6	206	300	±90					

## Anchor Series

High Strength Anchoring Tension Rod  
ModelJMG01

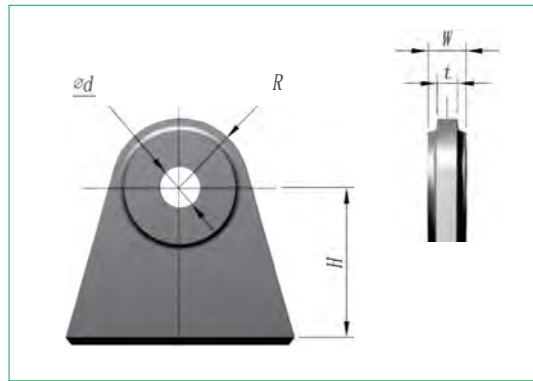


Note: The highest strength grade of the threaded rod can be grade 850 ( Φ20~Φ130 ), grade 1100 ( Φ20~Φ80 ), can be selected depending on usage requirement.

Rod Diameter (D)	Thread Specification	S	Rod Diameter (D)	Thread Specification	S
Φ20	M24x3		Φ80	M90x6	176
Φ25	M30x3.5	72	Φ85	M95x6	188
Φ30	M36x4	88	Φ90	M100x6	195
Φ35	M39x4	95	Φ95	M105x6	206
Φ40	M45x4.5	102	Φ100	M110x6	215
Φ45	M52x5	110	Φ105	M115x6	225
Φ50	M56x5.5	123	Φ110	M120x6	237
Φ55	M64x6	135	Φ115	Tr125x6	245
Φ60	M68x6	140	Φ120	Tr130x6	242
Φ65	M72x6	150	Φ125	Tr135x6	254
Φ70	M80x6	155	Φ130	Tr140x6	260
Φ75	M85x6	169			

## Ear Plate Series

Ear Plate Model JEB



Model Instruction: EB-X

Hole Diameter for Pin on Ear Plate

## Notes

1. Following parameters are for reference. The ear plate is confirmed according to the welding length. It is available to weld the stiffened Plate to reinforce.

2. Recommended material of ear plate is Q345 to match the tension rod grade 460 or lower, Recommended material of ear plate is Q390 to match the tension rod grade 550, Recommended material of ear plate is Q420 to match the tension rod grade 650.

Pc	d	R	H	t	W	Pc	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						

## Installation Instructions and Notes for Steel Tension Rod

### Installation Instructions

#### 1. Assembly Preparation 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 locknut 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, anti losing washer and a locking screw pin on the other end.



Complete the assembly.

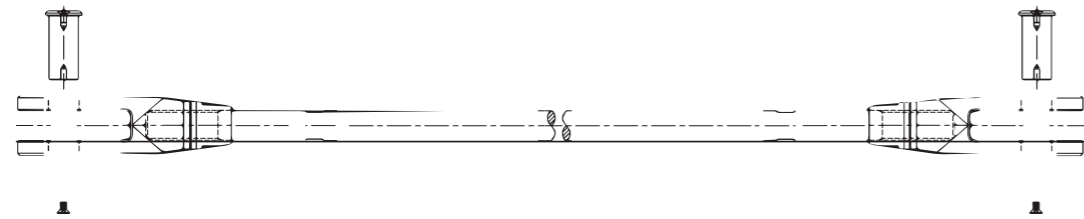


## Construction Site Installation

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  $\Phi 20$  and below, U shape circlip is used to fix the pin.

U-shape circlip installation drawing



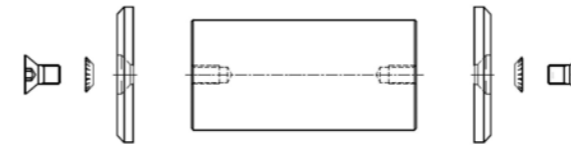
U-shape circlip



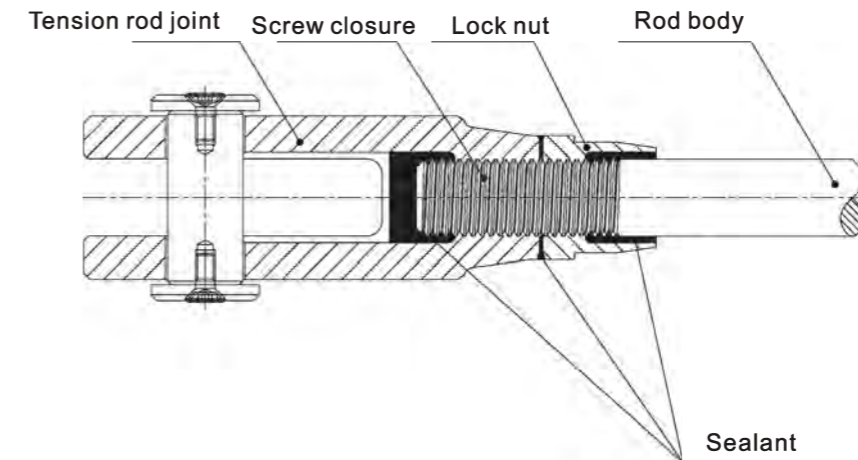
Circlip plier



For tension rod with diameter  $\geq 20$  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. Draging, 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 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 carried 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 technology, now we have developed the cast steel joint to match cable and rod. Generally the material of cable clamp and cast steel joint is 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.



Multi-bar junction joint



Lower chord structure support joint



Annular dome supporting joint



Lower chord structure support node



Confluence spherical equilibrium joint



Confluence transform equilibrium joint



Big multi-cable confluence joint (weight:48t/pcs)



Big steel structure endpoint joint(weight: 56t/pcs)



Loop cable clamp



Loop cable clamp



Mast joint



Knuckle bearing cable clamp



Single-cable adjustable lower brace strut clamp



Double-cable adjustable lower brace strut clamp



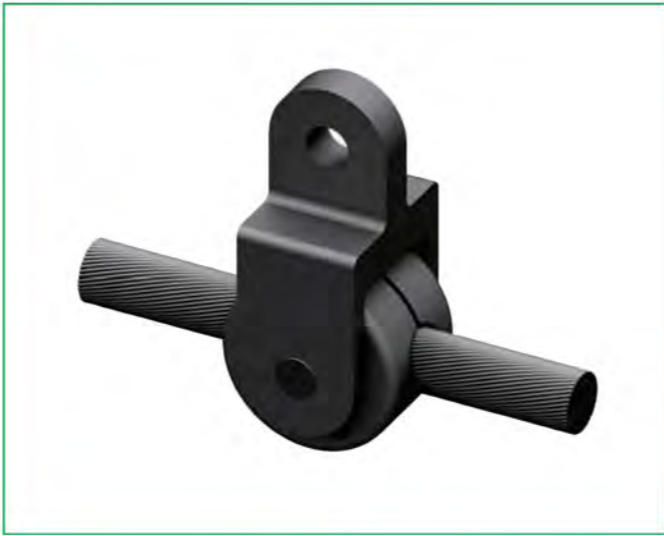
Adjustable clamp with double brace strut



Double-cable suspension cable clamp



Lower brace strut ball clamp



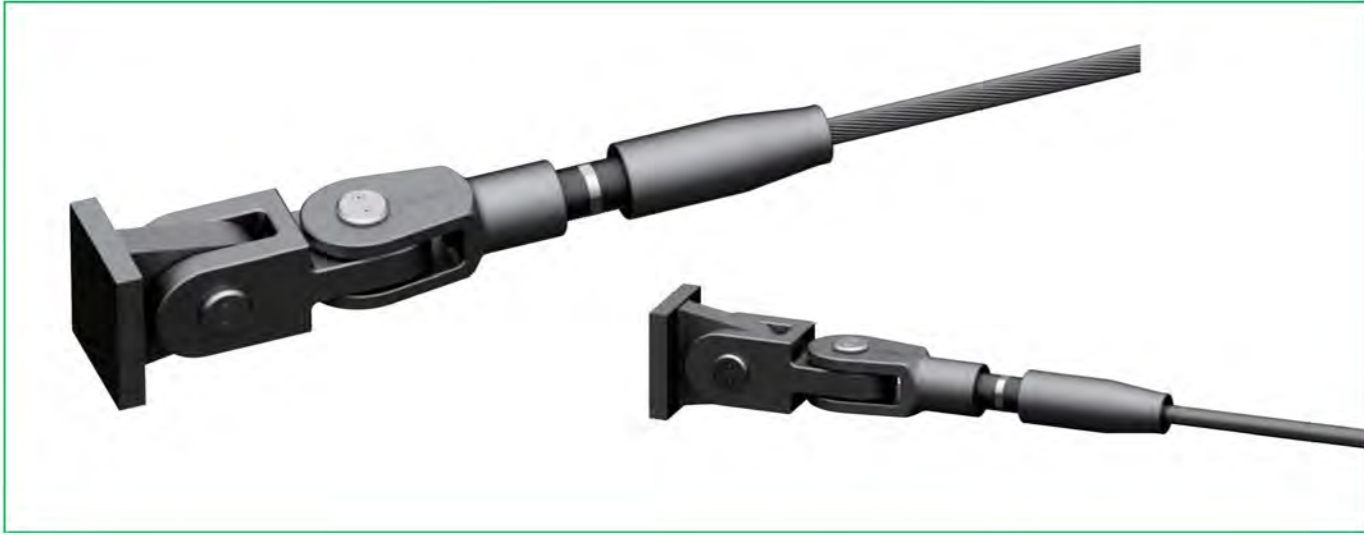
Adjustable suspension cable clamp



Butterfly shape adjustable cable clamp



Round center connection clamp



Cable connector



Adjustable center connection clamp



Fork joint



## Project Case- stadium

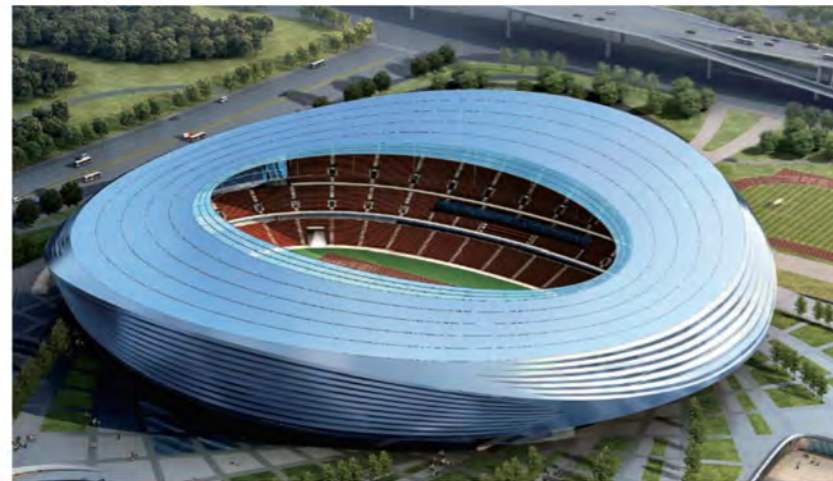


### Xuzhou Olympic Sports Center

Galfan cable:  $\Phi 70$ ,  $\Phi 90$ ,  $\Phi 100$ ,  $\Phi 121$ ,  $\Phi 127$   
Steel tension rod:  $\Phi 25$

### Zhengzhou Olympic Sports Center

Galfan cable:  $\Phi 16$ ,  $\Phi 30$ ,  $\Phi 38$ ,  $\Phi 110$ ,  $\Phi 116$ ,  
 $\Phi 119$ ,  $\Phi 140$   
Locked coil cable:  $\Phi 130$   
Cast steel



### Changchun Olympic Sports Center

Galfan cable:  $\Phi 65$ ,  $\Phi 85$ ,  $\Phi 120$ ,  $\Phi 135$



### Ordos Ejin Horo Banner Stadium

Galfan cable:  $\Phi 32$ ,  $\Phi 38$ ,  $\Phi 40$ ,  $\Phi 48$ ,  $\Phi 56$ ,  $\Phi 65$   
Cast steel



## Project case- exhibition center

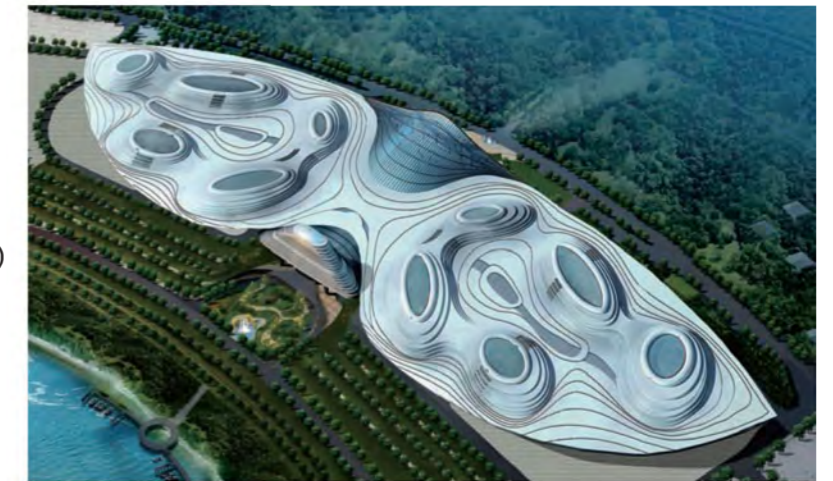


### Shijiazhuang International Expo Center

Galfan tension cable:  $\Phi 60$ ,  $\Phi 71$ ,  $\Phi 80$ ,  $\Phi 99$ ,  $\Phi 116$ ,  
 $\Phi 133$ ,  $\Phi 35$ ,  $\Phi 40$ ,  $\Phi 80$   
Steel tension rod:  $\Phi 35$ ,  $\Phi 40$ ,  $\Phi 80$   
Cast steel

### Chongqing International Expo Center

Galfan tension cable:  $\Phi 32$ (around 4000 pieces)  
Steel tension rod:  $\Phi 25$



### China Western Expo Center

Steel tension rod:  $\Phi 60$ ,  $\Phi 80$

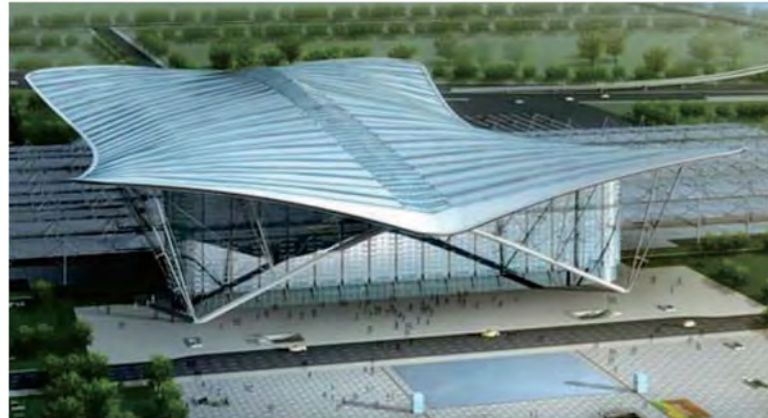


### Jiangsu Opera House

Steel tension rod :  $\Phi 40$



## Project case- transportation hub



### Qingdao North Station

Galfan cable:  $\Phi 30$ ,  $\Phi 50$ ,  $\Phi 60$ ,  $\Phi 74$ ,  $\Phi 84$ ,  
 $\Phi 106$ ,  $\Phi 126$

### Handan Passenger Terminal Center

Galfan cable:  $\Phi 68$ ,  $\Phi 110$ ,  $\Phi 136$



### Saudi Makkah Railway Station

Steel tension rod:  $\Phi 150$

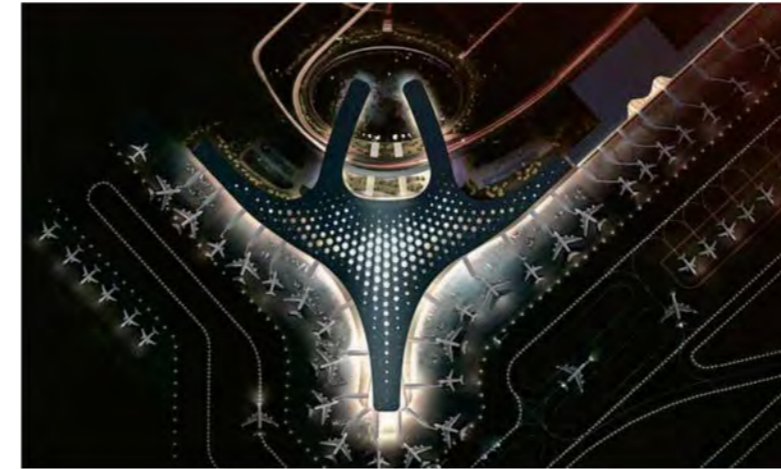


### Wuxi Metro Line 2

Steel tension rod:  $\Phi 25$ ,  $\Phi 40$ ,  $\Phi 60$



## Project case- airport



### Changchun Long Jia Airport Phase II

Locked coil cable:  $\Phi 40$

### Saudi Jeddah Airport

Steel tension rod:  $\Phi 25$ ,  $\Phi 60$



### Guangzhou Baiyun Airport Terminal 2

Steel tension rod:  $\Phi 40$ ,  $\Phi 45$ ,  $\Phi 50$ ,  $\Phi 55$ ,  $\Phi 60$ ,  $\Phi 70$ ,  
 $\Phi 75$ ,  $\Phi 80$

### Beijing New Airport (Capital Second Airport)

Steel tension rod:  $\Phi 40$ ,  $\Phi 50$ ,  $\Phi 60$ ,  $\Phi 65$ ,  $\Phi 70$ ,  
 $\Phi 80$ ,  $\Phi 120$



## Project case- building complex



### Qingdao North Station

Galfan cable:  $\Phi 30$ ,  $\Phi 50$ ,  $\Phi 60$ ,  $\Phi 74$ ,  $\Phi 84$ ,  $\Phi 106$ ,  $\Phi 126$

### Shanghai International Financial Center

Galfan cable:  $\Phi 20$ ,  $\Phi 28$ ,  $\Phi 59$   
Steel tension rod:  $\Phi 16$



### Cscec Steel Tower

Tension-compression rod:  $\Phi 121 \times 14$ ,  $\Phi 250 \times 18$

### AIIB Headquarters Building

Galfan cable:  $\Phi 42$ ,  $\Phi 90$   
Steel tension rod: M30, M40 anchor bolt,  $\Phi 35$ ,  
 $\Phi 55$  tension rod



## Project case- commercial complex



### Qinhuangdao Century Harbor Commercial Center

Galfan cable:  $\Phi 26$ ,  $\Phi 32$ ,  $\Phi 36$

### Shanghai Hongqiao SOHO Commercial Plaza

Steel tension rod:  $\Phi 140$ ,  $\Phi 180$



### Qingdao Wanda Plaza

Steel tension rod:  $\Phi 50$ ,  $\Phi 55$ ,  $\Phi 60$

### Wuxi IKEA Shopping Center

Steel tension rod:  $\Phi 20$ ,  $\Phi 40$ ,  $\Phi 50$



## Project case-landscape footbridge



### Shanghai Disney Landscape Footbridge

Galfan cable:  $\Phi 68$ ,  $\Phi 63$   
 Locked coil cable:  $\Phi 90$ ,  $\Phi 115$   
 Steel tension rod:  $\Phi 16$   
 Cast steel

### Saudi SABIC Suspension Cable Footbridge

Galfan cable:  $\Phi 30$ ,  $\Phi 80$   
 Cast steel



### Shi Lin Gorge Glass Landscape Platform

Galfan cable:  $\Phi 20$ ,  $\Phi 30$ ,  $\Phi 50$

### Shanghai Zhang Jiagang Bridge

Locked coil cable:  $\Phi 65$



## Project case- other projects

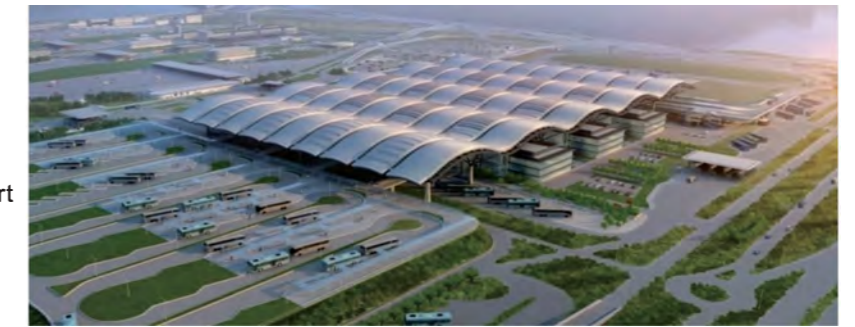


### Beijing Fangshan Liangxiang Satellite City Sewage Treatment Plant

Galfan cable:  $\Phi 16$ ,  $\Phi 30$

### 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



### Saudi Riyadh National Library

Membrane structure tension rod:  $\Phi 10$

### Baosteel Guangdong Zhanjiang Steel Base Project Dock

Dock tension rod:  $\Phi 70$





Steel Tension Cable Series



Steel Tension Rod Series



Casting Steel Joint



Point-fixed Glass Curtain Wall Accessories



Aluminum Door & Window Accessories



PVC Steel Door & Window Accessories



EPDM Sealing Strip Series



Door Control Accessories



Power Step



Titanium Alloy Ladder



Glass Door Series



Integrated Curtain Rail



Thermal Instrument



Industrial Substrate Appliance



Foaming Agent Series