

CONSTANT EFFORT SUPPORTS

The design of the current range of constant effort supports is the result of experience and know how accrued over several decades.

The present form and function of the Constant Effort Supports are based on the geometry derived from this know how such that the theoretical deviation of supporting effort as the pipe moves from cold to hot or vice versa is kept to a minimum. By reducing the number of rotating joints and providing maintenance free PTFE based bearings on rotating joints, friction is reduced to an extent where there is little deviation between theory & practice.

Helical coil compression springs play a major role in the performance of supports and engineers at Pipe Hangers & Supports have made great efforts to design a compact range of springs capable of delivering the performance demanded of them. They are also designed keeping in mind present trends in plant design with increasing space limitations with smaller head rooms and form factor typical to Power Plants, Process plants, Off shore rigs & marine applications.

Other important considerations during design stage are:

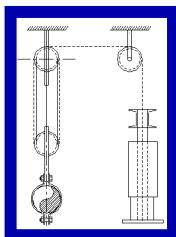
- Effect of spring ageing or fatigue
- The ambient environment that the supports function in.
- The needs of the pipe work company to "balance" lines during erection.
- The need to revise pre-set loads on hangers due to changes in routing or otherwise that may occur on-site after completion of supplies.
- Quick and easy locking and un-locking of hangers during operation for undertaking maintenance activities like routine gasket changes, valve replacements etc
- Such above operations to be carried out with out any special tools and tackles and make do with std tools and tackles already available at site.
- Structurally rigid to withstand handling prior to erection.
- Large well readable travel scales and pointers to show actual travel position during operation, visible from a distance.

APPLICATION

Constant effort supports are complex mechanical leverage systems designed to provide a constant supporting effort as the pipe moves from cold position to hot position or vice-versa. Constant effort supports are normally used for large vertical movements typically more than 50mm to 60mm or when the travel provided by variable effort supports are insufficient. There are certain typical situations where the movements are small but the stress engineer does not want any differential loading to be transferred from pipe to other attached equipment and the result is the use of a constant effort support.

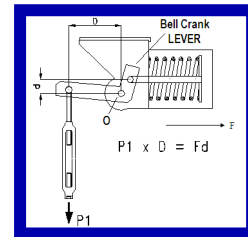
The Pipe Hanger and Supports range of Constant effort supports are based on the "Bell Crank Lever" mechanism.

To very simply illustrate the working idea of a constant effort support consider the sketch below :



A pipe is suspended from a wire rope connected to a dead weight by using a pulley mechanism. As the pipe moves up the dead weight moves down and moves up when the pipe moves down. The weight of the pipe is perfectly counterbalanced by the dead weight such that the pipe can be said to be floating.

The modern Constant effort support using the Bell crank lever mechanism and its geometry and mathematics is illustrated below.



The Bell crank lever rotates around the Fulcrum point 'O'. One end of the Bell crank lever is connected to the pipe 'P1', the other end is connected to the spring by the tie rod. Thus when the pipe moves down from cold to hot condition, the point P1 moves down, and as it moves down the Bell crank lever will rotate in the anti clock wise direction & tie rod connected to the spring will be pulled in, by which the spring gets further compressed.

When the pipe moves up the bell crank lever will rotate (in the clock wise direction) & the tie rod connected to spring will be pushed out thus allowing the spring to expand or relax. By computing moments around the fulcrum point 'O', we will arrive at the formula:

$$P1 \times D = F \times d$$

$$P1 = F \times d$$

$$D$$

Our purpose is to keep P1 constant i.e the reaction experienced by the pipe as a constant. As the bell crank rotates around the Fulcrum point 'O', the values of 'F' (the load due to the spring reaction) 'd' & 'D' will change in such a predetermined manner so as to keep value of 'P1' constant. Theoretically & mathematically the value of P1 will remain constant but due to friction at rotating points, spring hysteresis, manufacturing tolerances, MSS-SP 58 allows a deviation of $\pm 6\%$ on the preset load and BS3974 allows $\pm 5\%$.

The formula for calculating the permitted deviation is :-

$$\text{Deviation from Specified Load} = \frac{\text{Max. Reading moving down} - \text{Min Reading Moving up}}{\text{Max. Reading moving down} + \text{Min Reading Moving up}}$$

RANGE

Our Standard range of Constant effort support units cater to movements upto 750mm and loads upto 50 tons.

FRAME SIZE AND SPRING SIZE

The support designation gives the support frame size and spring size:

$$\text{CE-17} \\ \text{FRAME SIZE CE} \quad \text{SPRING SIZE 17}$$

Many dimensions are common for a given frame size.

SUPPORT TYPES

We offer eleven standard support types:

- H1** Horizontal type – single point suspension
- H2** Horizontal type – double point suspension
- V1** Vertical type – single point suspension
- V2** Vertical type – double point suspension
- VU1** Vertical inverted type – single point suspension
- VU2** Vertical inverted type – double point suspension
- HFMH** Horizontal base mounted
- HFMT** Horizontal base mounted compression seat
- VFM** Vertical base mounted
- VFMT** Vertical base mounted compression seat
- VUB** Vertical inverted base mounted

CONSTANT EFFORT SUPPORTS

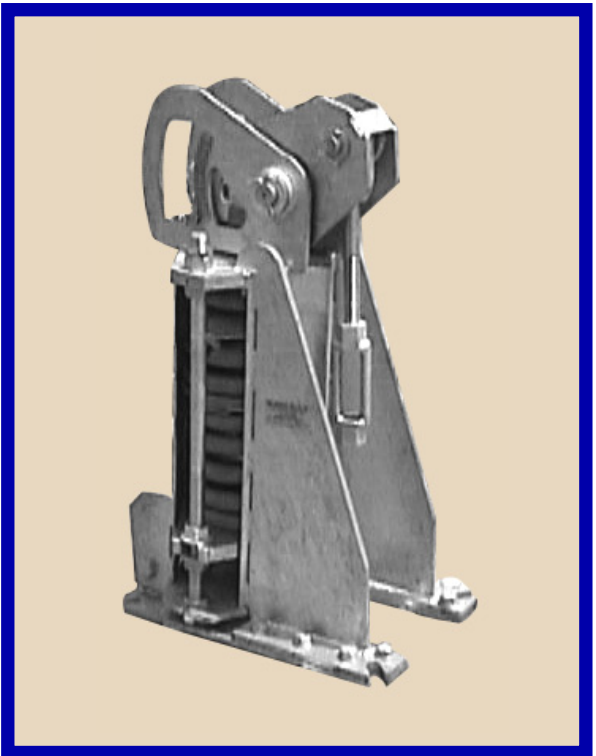
Details of Vertical inverted tandem type (type VIT) are available on request.

SUSPENSION STYLES

For the suspended types, five styles of top suspension are available, namely **S1**, **S2**, **S3**, **S4** and **S5**.



Constant Effort Supports Type HFMT

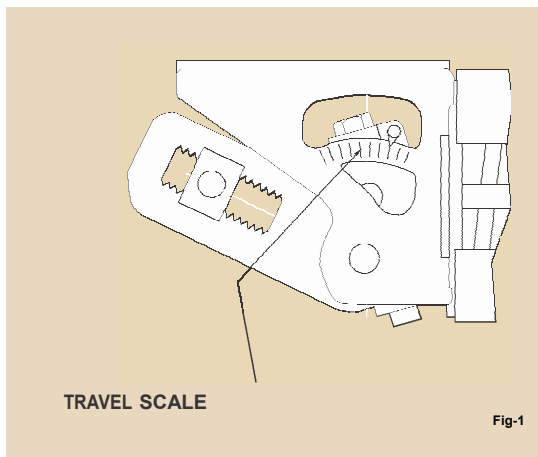


Type VFM

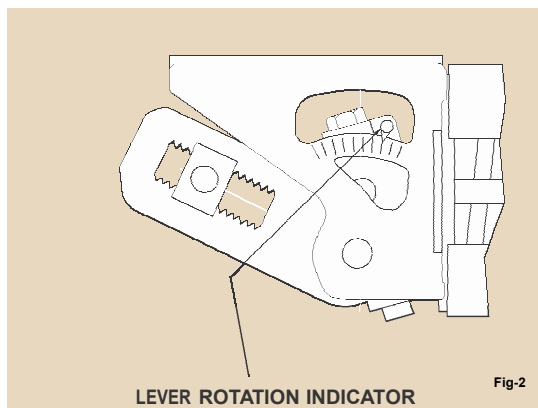
CONSTANT EFFORT SUPPORTS

STANDARD FEATURES

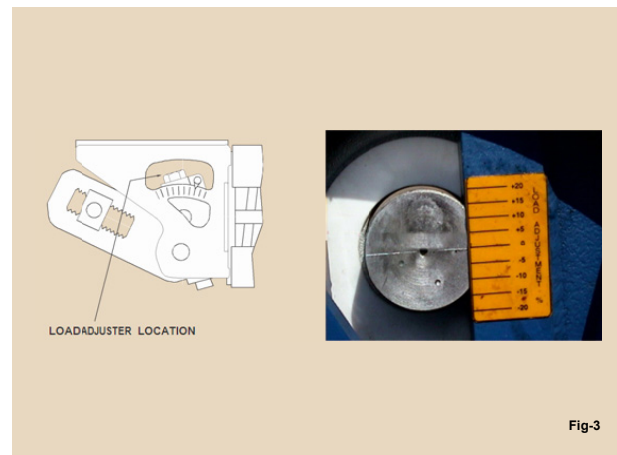
1. Units are compact with minimum head room requirements, installed heights and over all foot print.
2. Travel indicator with travel scale as illustrated in Fig 1 below enables monitoring of pipe work movement & visible from a distance. The "Hot" & "Cold" set positions are marked on the travel scale by means of a red & blue coloured washer riveted on the travel scale enabling visual confirmation of any system irregularities like excess movement etc.



3. The lever rotation indicator (see Fig 2 below) provides a visual indication of position of lever and whether the hanger is loaded correctly. If the indicator is at the back of the window then the spring is under loaded and if at the front then the support is overloaded. If the indicator is not at the extremities then support is taking the load correctly. When the indicator is at the extremities then support load / travel adjustment may be required.

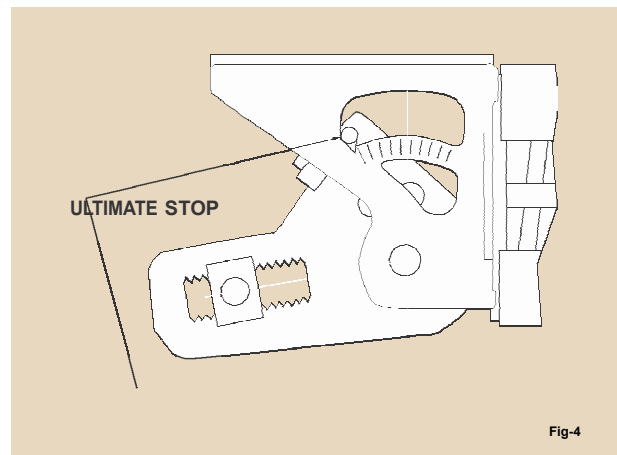


4. A load adjustment facility of $\pm 20\%$ (of the set preset cold load of the support) is available on the support units. This adjustment can be carried out on site with out any special tools or tackles and with out compromising the travel provided. The adjustment can be carried out by rotating the Load adjuster as shown in Fig 3 below and read out the amount of adjustment from the load adjustment scale attached to lever as shown.



5. Ultimate Stop. The geometry of the frame, lever and its attachments are designed in such a way that in case of over load / travel the lever will be arrested prior to the spring becoming solid, thus protecting the helical coil from excessive stresses.

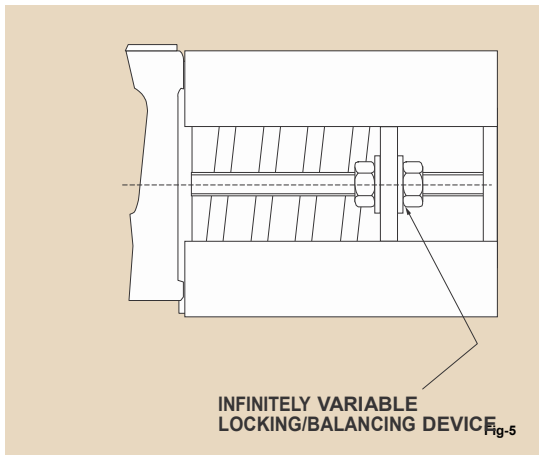
(See Fig 4)



6. The Pipe Hangers & Supports Constant Effort Support Units are shipped to site in the Preset locked position as indicated in the contract drawings. The Infinitely Variable Locking / Balancing device used for preset locking consists of 2 threaded rods which run the full length of the spring can. The locking at preset position is achieved by locking the piston plate above the spring as shown below in Fig 5. The support then becomes a rigid member. Thus the locking device is permanently attached to the support and can be used any number of times and since it is threaded, the support can be locked anywhere in its travel range i.e. infinitely variable number of positions.

CONSTANT EFFORT SUPPORTS

STANDARD FEATURES



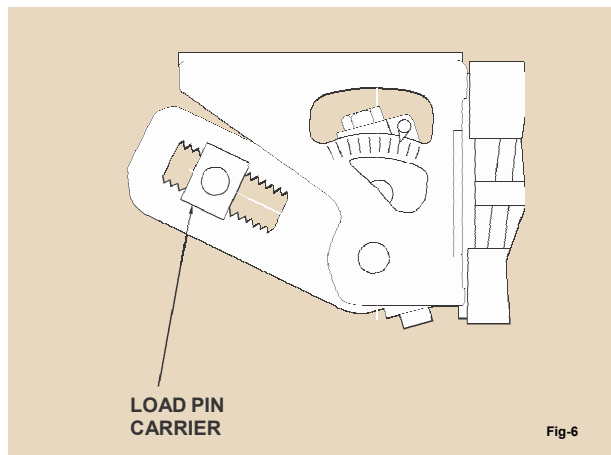
7. Variable Position Load Pin Carrier as shown in Fig 6 below is fitted on supports whose total travel is greater than following values : CA -1 120 etc

CA-1: 120 mm, CB: 120 mm,

CC: 120 mm, CD: 160 mm, CE: 100 mm, CF: 130 mm, CG: 180 mm.

Once the carrier is repositioned, there is still the $\pm 20\%$ load adjustment available.

By moving the load pin carrier closer to the fulcrum travel is reduced, load is increased by moving it away, the travel is increased and load is decreased, thus allowing maximum flexibility in situations where changes are required to loads and travels. This adjustment and flexibility is provided with out sacrificing the $\pm 20\%$ load adjustment facility.



8. The Serial nos of each support is unique allowing traceability of support details, MOC & spring test certificate of spring manufacturer.

The name plate of constant effort support shown below provided all details required for identification of support, load / travel details, size of support etc.

PIPE HANGERS & SUPPORTS PVT. LTD.				
PLOT NO. 18 - 23, SIDCO INDUSTRIAL ESTATE				
NANJIKOTTAI, THANJAVUR - 613 006, INDIA				
TEL : 04362-255357				
FAX : 04362-255367				
CONSTANT LOAD SUPPORT				
SERIAL NUMBER	SUPPORT SIZE	LOCATION MARK		
LBS	KG	INCHES	MM	
LOAD		TOTAL MOVEMENT		

9. Every Constant Effort Support Unit is tested on our test rig and calibrated to contractual load & travel requirements. The deviation in supporting forces as the lever is actuated from top to bottom position is recorded and compared to allowed deviations as stipulated in MSS –SP 58 before declaring it fit for service. A test certificate is produced giving all the observed load & travel values as part of final documentation.

10. Our standard finish is to thoroughly clean and apply a metal primer followed by a finish top coat designed for the protection of fabricated steel articles. Other project specific specialty & high performance coatings to suit varying site / ambient requirements can be provided on request.

CONSTANT EFFORT SUPPORTS

SELECTION

Constant effort support sizes can be selected based on input parameters manually by looking at the selection chart or by using a software issued by us.

SELECTION BY USING CATALOGUE

Determine the Hot load or working load of the Unit (Remember that in a constant effort unit the hot load = cold load or preset load = operating load).

Add over travel to actual travel to arrive at required travel. Recommended to add 10% as over travel or 25 mm whichever is maximum.

Decide on the model, type and suspension style of the support that is intended for use.

Having decided type of hanger, load, travel required refer the load selection chart and proceed as follows.

- a) Locate total travel required at side of chart.
- b) Move horizontally across until load equal to or just greater than the load to be supported is located. Never select less than the actual load.
- c) Read off vertically support size.
- d) Return to load and move down remaining in same vertical column until nearest figure to design load is found.
- e) Returning horizontally across this column will give total travel provided for this support.

DETERMINATION OF SUPPORT DIMENSIONS

Having selected the appropriate support size, model, type, total movement provided, proceed to work out the dimensions.

1. Refer Page 8 & 32 to show the appropriate type.
2. Open out correct page for referring dimensions of appropriate frame selected ex CA, CB, CC etc
3. Dimensions can be read from tables as shown:

Dimensions are in one of four categories:

a) Dependent on Movement Provided

Dimensions dependent on movement provided, these dimensions are provided on the right hand page and in the table headed single point suspension.

b) Travel Range Dependent

Travel range dependent. The dimensions are prefixed with a "T" or a "U" and given on left hand table on the left hand page. Note, the spring dependent dimensions for the top suspension details like AA, BB are shown in this table.

c) Spring Size Dependent

Spring Size dependent, These dimensions start with the prefix "S" and provided in the mid centre table on left hand page.

d) Fixed

Fixed, These dimensions start with prefix "F" or "X" and can be read off top centre table on left hand page.

4. Rod take out dimensions A1, A2, A3, J4, J5, J6, J7 & J8 and pivot to load pin dimensions D & E are given at zero rotation of lever. In this connection it is noteworthy to mention that the total rotation of the lever is 45 Deg from top position to bottom position. Hence these dimensions refer to lever at top most position. To work out the take out dimension at preset load Subtract actual travel from total travel and divide by 2. This figure must be added to A1, A2, A3 or subtracted from J4, J5, J6, J7 or J8.

ORDERING INFORMATION

For ordering information refer to page 20, 21

CONSTANT EFFORT SUPPORTS

INSTALLATION AND ERECTION

Refer the Erection installation manual for detailed instructions or download a copy from our website www.pipehangers.in.

MAINTENANCE

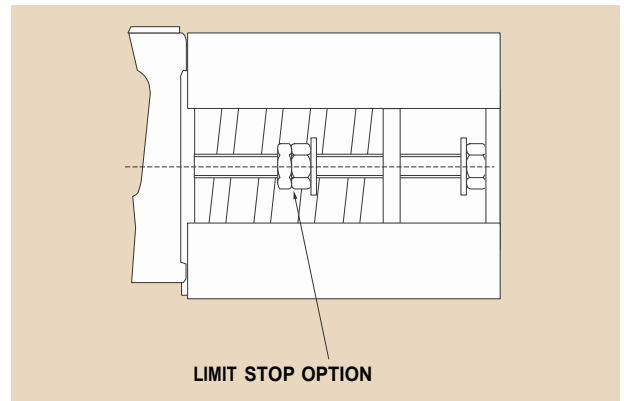
It is recommended that the supports are visually inspected once in 6 months by conducting a walk down along the pipe work.

Look for foreign objects left over from erection or maintenance activities like tools or construction debris which can impair operation of the support by obstruction.

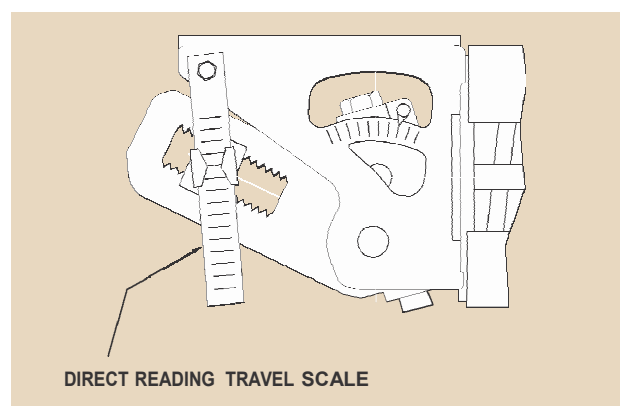
The position of the travel indicator is not at the extremities and that it is close to the intended HOT or COLD marking on the travel scale.

OPTIONAL FEATURES

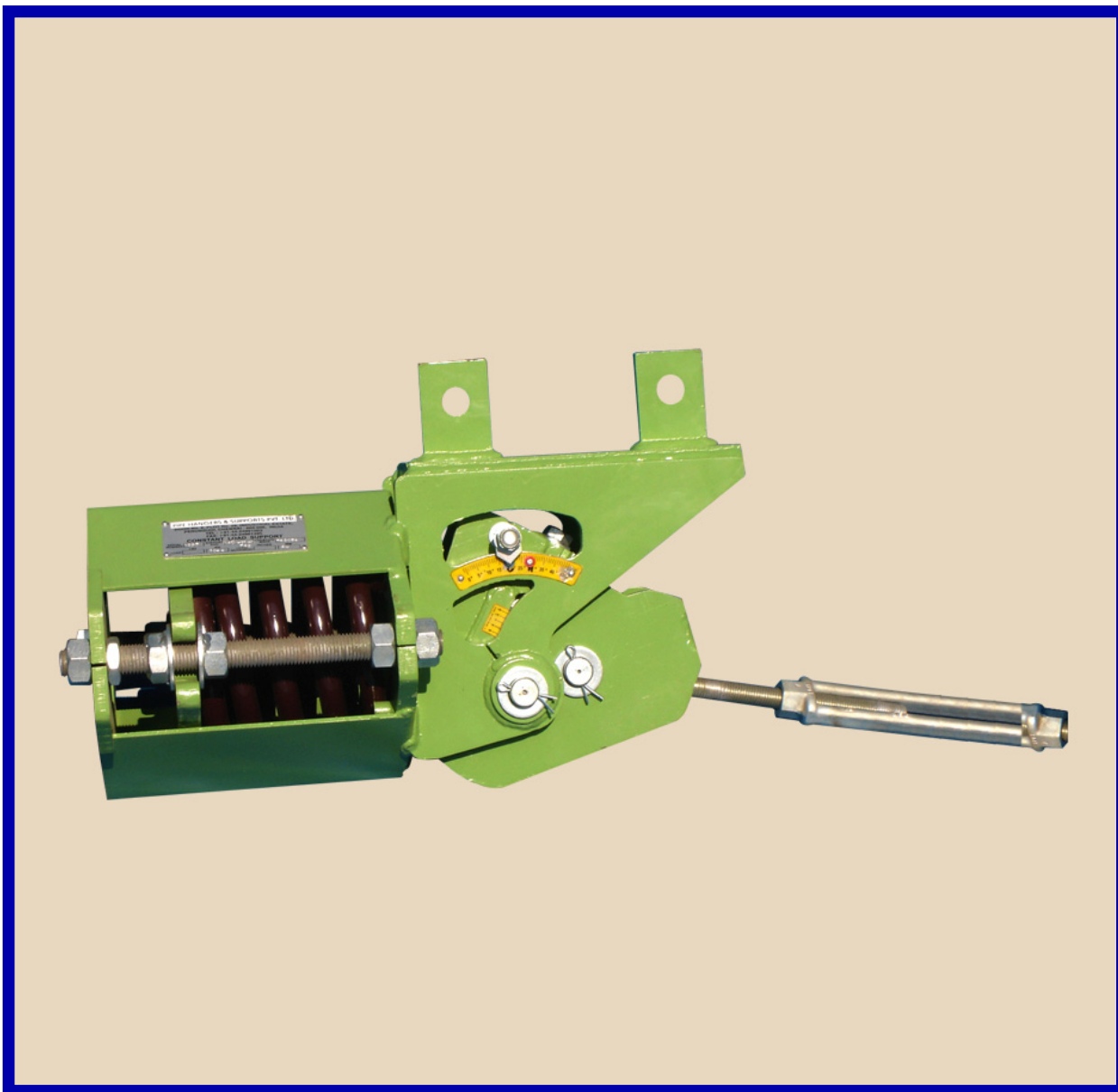
1. **Limit Stops** : Sometimes the piping engineer may want to restrict the movement of pipe beyond a certain predetermined level. The infinitely locking / balancing mechanism lends itself to such provisions with ease. By simply adding an additional nut in place the travel gets restricted and will act as a limit stop. (See Fig below for details)



2. The supports can be supplied with plastic coated coils for superior corrosion resistant properties. The partnering spring can and attachments need to be Hot dip Galvanized. Since the support is of a bolted construction no welding activity takes place after galvanizing
3. Where extreme corrosive conditions exist, extra thick body parts can be supplied.
4. For supports operating in sub zero temperatures the MOC is different, please ask for details.
5. For Foot mounted supports HFMT & VFMT where large axial or transverse movements are envisaged or the loadings in that direction exceed 25% of vertical loads, the load flange can be supplied with low friction sliding pads.

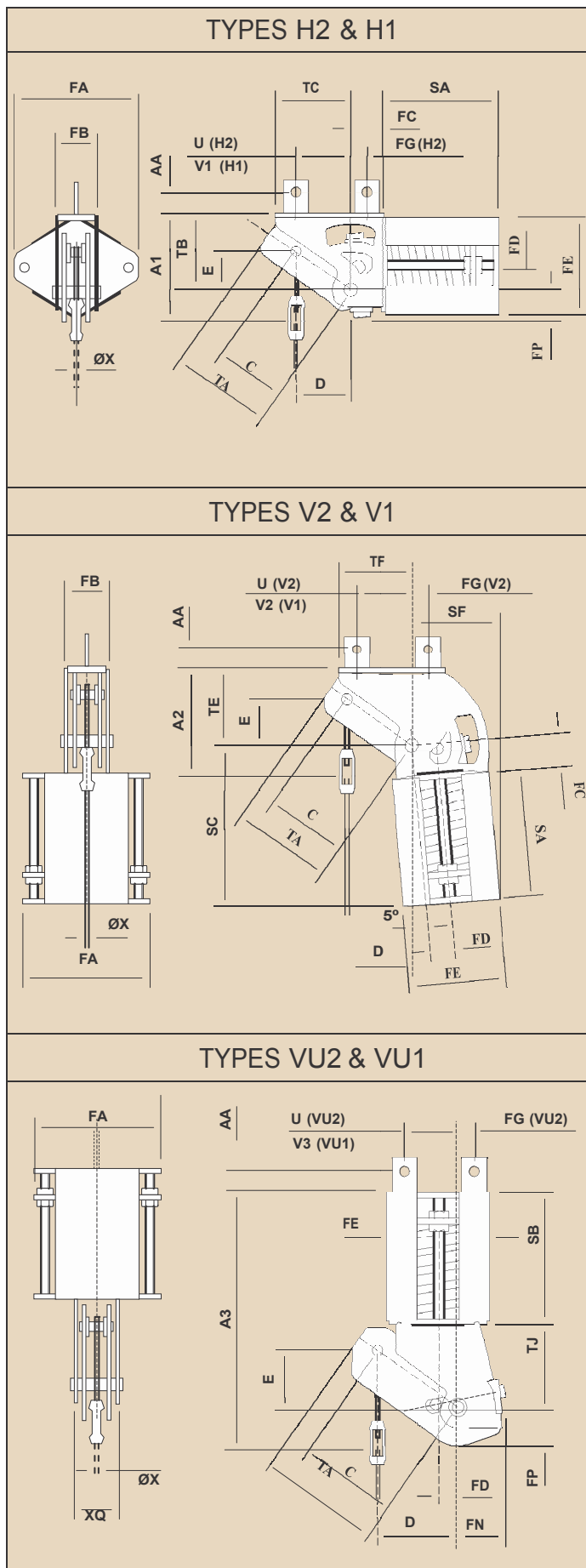


CONSTANT EFFORT SUPPORTS



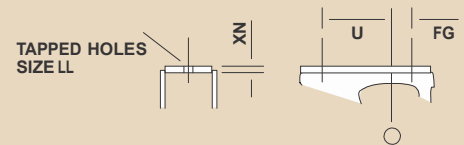
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CONSTANT EFFORT SUPPORTS: SUSPENDED TYPES

CONSTANT EFFORT SUPPORTS: SUSPENDED TYPES



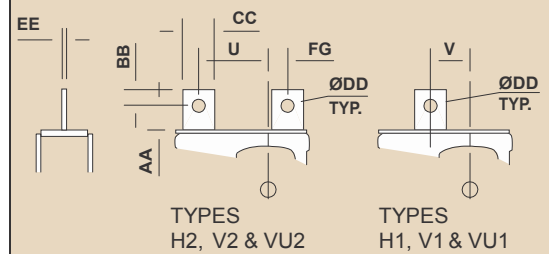
ALTERNATIVE TOP SUSPENSION STYLES

STYLE S1 (TYPES H2 & V2)

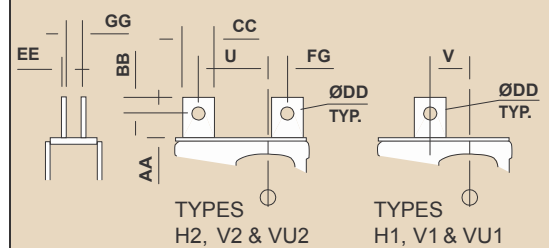


TYPES H2 & V2

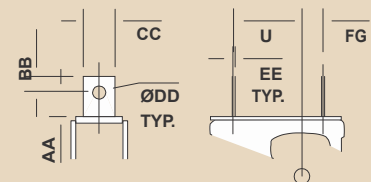
STYLE S2 (ALL TYPES)



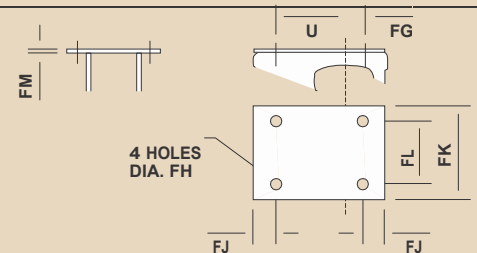
STYLE S3 (ALL TYPES)



STYLE TS4 (TYPES HD, VD & VID)



STYLE TS5 (TYPES HD & VD)



TYPES H2 & V2

CONSTANT SUPPORT SELECTION CHART (LOADS IN NEWTONS)

SIZE	CA-1	CA-2	CA-3	CA-4	CB-5	CB-6	CB-7	CC-8	CC-9	CC-10	CD-11	CD-12	CD-13	CD-14	CD-15	CE-16	CE-17	CE-18	CE-19	
TRAVEL																				TRAVEL
40	724	1001	1316	1837	2307	3242	4182	4615	6484	8364	11074	14767	19674							40
50	579	801	1052	1470	1846	2593	3346	3692	5187	6691	8859	11813	15739	21256	29658					50
60	482	667	877	1225	1538	2161	2788	3076	4322	5576	7383	9844	13116	17714	24715	33506	42495			60
70	413	572	752	1050	1318	1852	2390	2637	3705	4779	6328	8438	11242	15183	21184	28719	36425	44830	56038	70
80	362	501	658	919	1154	1621	2091	2307	3242	4182	5537	7383	9837	13285	18536	25130	31872	39227	49033	80
90	322	445	585	817	1025	1441	1859	2051	2882	3717	4922	6563	8744	11809	16477	22337	28330	34868	43585	90
100	289	400	526	735	923	1297	1673	1846	2593	3346	4322	5907	7869	10628	14829	20104	25497	31381	39227	100
110	263	364	478	668	839	1179	1521	1678	2358	3041	4027	5370	7154	9662	13481	18276	23179	28528	35661	110
120	241	334	439	612	769	1081	1394	1538	2161	2788	3691	4922	6558	8857	12358	16753	21248	26151	32689	120
130	223	308	405	565	710	997	1287	1420	1995	2574	3407	4544	6053	8176	11407	15464	19613	24139	30174	130
140	207	286	376	525	659	926	1195	1318	1852	2390	3164	4219	5621	7592	10592	14360	18212	22415	28019	140
150	193	267	351	490	615	864	1115	1231	1729	2230	2953	3938	5246	7085	9886	13402	16998	20921	26151	150
160	181	250	329	459	577	810	1046	1154	1621	2091	2769	3692	4918	6643	9268	12565	15936	19613	24517	160
170	170	236	310	432	543	763	984	1086	1526	1968	2606	3475	4629	6252	8723	11826	14998	18460	23074	170
180	161	222	292	408	513	720	929	1025	1441	1859	2461	3281	4372	5905	8238	11169	14165	17434	21793	180
190	152	211	277	387	486	682	880	972	1365	1761	2331	3109	4142	5594	7805	10581	13420	16516	20646	190
200	145	200	263	367	461	648	836	923	1297	1673	2215	2953	3935	5314	7415	10052	12749	15691	19613	200
210	138	191	251	350	439	617	797	879	1235	1593	2109	2813	3747	5061	7061	9573	12142	14943	18679	210
220	132	182	239	334	420	589	760	839	1179	1521	2013	2685	3577	4831	6741	9138	11590	14264	17830	220
230	126	174	229	320	401	564	727	803	1128	1455	1926	2568	3421	4621	6447	8741	11086	13644	17055	230
240	121	167	219	306	385	540	697	769	1081	1394	1846	2461	3279	4428	6179	8377	10624	13076	16344	240
250	116	160	210	294	369	519	669	738	1037	1338	1772	2363	3148	4251	5932	8041	10199	12553	15691	250
260	111	154	202	283	355	499	643	710	997	1287	1704	2272	3027	4088	5704	7732	9807	12070	15087	260
270	107	148	195	272	342	480	620	684	961	1239	1641	2188	2915	3936	5492	7446	9443	11623	14528	270
280	103	143	188	262	330	463	597	659	926	1195	1582	2110	2811	3796	5296	7180	9106	11208	14009	280
290	100	138	181	253	318	447	577	637	894	1154	1527	2037	2714	3665	5113	6932	8792	10821	13526	290
300	96	133	175	245	308	432	558	615	864	1115	1477	1969	2623	3543	4943	6701	8499	10460	13076	300
310					298	418	540	595	837	1079	1429	1905	2539	3428	4784	6485	8225	10123	12654	310
320					288	405	523	577	810	1046	1384	1846	2459	3321	4634	6282	7968	9807	12258	320
330					280	393	507	559	786	1014	1342	1790	2385	3221	4494	6092	7726	9509	11887	330
340					271	381	492	543	763	984	1303	1737	2315	3126	4362	5913	7499	9230	11537	340
350					264	370	478	527	741	956	1266	1688	2248	3037	4237	5744	7285	8966	11208	350
360					256	360	465	513	720	929	1230	1641	2186	2952	4119	5584	7083	8717	10896	360
370					249	350	452	499	701	904	1197	1596	2127	2872	4008	5433	6891	8481	10602	370
380					243	341	440	486	682	880	1166	1554	2071	2797	3902	5290	6710	8258	10323	380
390					237	332	429	473	665	858	1136	1515	2018	2725	3802	5155	6538	8046	10058	390
400					231	324	418	461	648	836	1107	1477	1967	2657	3707	5026	6374	7845	9807	400
410								450	633	816	1080	1441	1919	2592	3617	4903	6219	7654	9567	410
420								439	617	797	1055	1406	1874	2531	3531	4787	6071	7472	9340	420
430								429	603	778	1030	1374	1830	2472	3449	4675	5930	7298	9122	430
440								420	589	760	1007	1342	1789	2416	3370	4569	5795	7132	8915	440
450								410	576	743	984	1313	1749	2362	3295	4467	5666	6974	8717	450
460								401	564	727	963	1284	1711	2310	3224	4370	5543	6822	8528	460
470								393	552	712	942	1257	1674	2261	3155	4277	5425	6677	8346	470
480								385	540	697	923	1231	1639	2214	3089	4188	5312	6538	8172	480
490								377	529	683	904	1205	1606	2169	3026	4103	5204	6404	8005	490
500								369	519	669	886	1181	1574	2126	2966	4021	5099	6276	7845	500
510											869	1158	1543	2084	2908	3942	4999	6153	7691	510
520											852	1136	1513	2044	2852	3866	4903	6035	7544	520
530											836	1114	1485	2005	2798	3793	4811	5921	7401	530
540											820	1094	1457	1968	2746	3723	4722	5811	7264	540
550											805	1074	1431	1932	2696	3655	4636	5706	7132	550
560											791	1055	1405	1898	2648	3590	4553	5604	7005	560
570											777	1036	1381	1865	2602	3527	4473	5505	6882	570
580											764	1018	1357	1832	2557	3466	4396	5411	6763	580
590											751	1001	1334	1801	2513	3407	4322	5319	6649	590
600											738	984	1312	1771	2472	3351	4250	5230	6538	600
610																3296	4180	5144	6431	610
620																3243	4112	5061	6327	620
630																3191	4047	4981	6226	630
640																3141	3984	4903	6129	640
650																3093	3923	4828	6035	650
660																3046	3863	4755	5943	660
670																3001	3806	4684	5855	670
680																2956	3750	4615	5769	680
690																2914	3695	4548	5685	690
700																2872	3642	4483	5604	700
710																2831	3591	4420	5525	710
720																2792	3541	4359	5448	720
730																2754	3493	4299	5374	730
740																2717	3446	4241	5301	740
750																2680	3400	4184	5230	750

SIZE	CA-1	CA-2	CA-3	CA-4	CB-5	CB-6	CB-7	CC-8	CC-9	CC-10	CD-11	CD-12	CD-13	CD-14	CD-15	CE-16	CE-17	CE-18	CE-19	
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DO NOT SELECT TYPES V1, V2 OR VFM ABOVE THE BLACK LINE.
DO NOT SELECT TYPES H1 OR VU1 BELOW THE RED LINE.
REMEMBER TO ADD OVERTRAVEL ALLOWANCE TO PIPE MOVEMENT BEFORE SELECTING SUPPORT SIZE.

CONSTANT SUPPORT SELECTION CHART (LOADS IN NEWTONS)

SIZE	CF-20	CF-21	CF-22	CF-23	CG-24	CG-25	CG-26	CG-27	CG-28	CG-29	CH-30	CH-31	CH-32	CL-33	CL-34	TRAVEL
TRAVEL																TRAVEL
40																40
50																50
60																60
70																70
80	63743	79679														80
90	56661	70826	87170	108963	122583	163444										90
100	50995	63743	78453	98066	110325	147100										100
110	46359	57948	71321	89151	100295	133727	167159									110
120	42495	53119	65378	81722	91937	122583	153229	183875	224736							120
130	39227	49033	60349	75436	84865	113154	141442	169730	207448	248938						130
140	36425	45531	56038	70048	78803	105071	131339	157607	192631	231157						140
150	33996	42495	52302	65378	73550	98066	122583	147100	179789	215746	294200					150
160	31872	39840	49033	61292	68953	91937	114922	137906	168552	202262	275812	344765				160
170	29997	37496	46149	57686	64897	86529	108162	129794	158637	190364	259588	324485	389382	432646	519176	170
180	28330	35413	43585	54481	61292	81722	102153	122583	149824	179789	245166	306458	367749	408610	490332	180
190	26839	33549	41291	51614	58066	77421	96776	116131	141938	170326	232263	290328	348394	387105	464526	190
200	25497	31872	39227	49033	55162	73550	91937	110325	134841	161810	220650	275812	330974	367749	441299	200
210	24283	30354	37359	46698	52536	70048	87559	105071	128420	154104	210142	262678	315214	350238	420285	210
220	23179	28974	35661	44576	50148	66864	83579	100295	12583	147100	200591	250738	300886	334318	401181	220
230	22172	27714	34110	42638	47967	63956	79946	95935	117253	140704	191869	239837	287804	319782	383738	230
240	21248	26560	32689	40861	45969	61292	76614	91937	112368	134841	183875	229843	275812	306458	367749	240
250	20398	25497	31381	39227	44130	58840	73550	88260	107873	129448	176520	220650	264780	294200	353039	250
260	19613	24517	30174	37718	42433	56577	70721	84865	103724	124469	169730	212163	254596	282884	334318	260
270	18887	23609	29057	36321	40861	54481	68102	81722	99883	119859	163444	204305	245166	272407	326888	270
280	18212	22765	28019	35024	39402	52536	65670	78803	96315	115578	157607	197009	236410	262678	315214	280
290	17584	21980	27053	33816	38043	50724	63405	76086	92994	111593	152172	190215	228258	253620	304344	290
300	16998	21248	26151	32689	36775	49033	61292	73550	89894	107873	147100	183875	220650	245166	294200	300
310	16450	20562	25307	31634	35589	47452	59314	71177	86994	104393	142355	177943	213532	237258	284709	310
320	15936	19920	24517	30646	34477	45969	57461	68953	84276	101131	137906	172383	206859	229843	275812	320
330	15453	19316	23774	29717	33432	44576	55720	66864	81722	98066	133727	167159	200591	222878	267454	330
340	14998	18748	23074	28843	32448	43265	54081	64897	79318	95182	129794	162242	194691	216323	259588	340
350	14570	18212	22415	28019	31521	42029	52536	63043	77052	92463	126086	157607	189128	210142	252171	350
360	14165	17706	21793	27241	30646	40861	51076	61292	74912	89894	122583	153229	183875	204305	245166	360
370	13782	17228	21204	26504	29818	39757	49696	59635	72887	87465	119270	149088	178905	198783	238540	370
380	13420	16775	20646	25807	29033	38710	48388	58066	70969	85163	116131	145164	174197	193552	232263	380
390	13076	16344	20116	25145	28288	37718	47147	56577	69149	82979	113154	141442	169730	188589	226307	390
400	12749	15936	19613	24517	27581	36775	45969	55162	67421	80905	110325	137906	165487	183875	220650	400
410	12438	15547	19135	23919	26908	35878	44847	53817	65776	78932	107634	134542	161451	179390	215268	410
420	12142	15177	18679	23349	26268	35024	43780	52536	64210	77052	105071	131339	157607	175119	210142	420
430	11859	14824	18245	22806	25657	34209	42762	51314	62717	75260	102628	128285	153942	171046	205255	430
440	11590	14487	17830	22288	25074	33432	41790	50148	61292	73550	100295	125369	150443	167159	200591	440
450	11332	14165	17434	21793	24517	32689	40861	49033	59930	71915	98066	122583	147100	163444	196133	450
460	11086	13857	17055	21319	23984	31978	39973	47967	58627	70352	95935	119918	143902	159891	191869	460
470	10850	13562	16692	20865	23473	31298	39122	46947	57379	68855	93893	117367	140840	156489	187787	470
480	10624	13280	16344	20431	22984	30646	38307	45969	56184	67421	91937	114922	137906	153229	183875	480
490	10407	13009	16011	20014	22515	30020	37525	45031	55037	66045	90061	112576	135092	150102	180122	490
500	10199	12749	15691	19613	22065	29420	36775	44130	53937	64724	88260	110325	132390	147100	176520	500
510	9999	12499	15383	19229	21632	28843	36054	43265	52879	63455	86529	108162	129794	144215	173059	510
520	9807	12258	15087	18859	21216	28288	35361	42433	51862	62235	84865	106082	127298	141442	169730	520
530	9622	12027	14802	18503	20816	27755	34693	41632	50884	61060	83264	104080	124896	138773	166528	530
540	9443	11804	14528	18160	20431	27241	34051	40861	49941	59930	81722	102153	122583	136203	163444	540
550	9272	11590	14264	17830	20059	26745	33432	40118	49033	58840	80236	100295	120354	133727	160472	550
560	9106	11383	14009	17512	19701	26268	32835	39402	48158	57789	78803	98504	118205	131339	157607	560
570	8946	11183	13764	17205	19355	25807	32259	38710	47313	56775	77421	96776	116131	129035	154842	570
580	8792	10990	13526	16908	19022	25362	31703	38043	46497	55796	76086	95108	114129	126810	152172	580
590	8643	10804	13297	16621	18699	24932	31165	37398	45709	54851	74796	93496	112195	124661	149593	590
600	8499	10624	13076	16344	18387	24517	30646	36775	44947	53937	73550	91937	110325	122583	147100	600
610	8360	10450	12861	16076	18086	24115	30143	36172	44210	53052	72344	90430	108516	120574	144688	610
620	8225	10281	12654	15817	17794	23726	29657	35589	43497	52197	71177	88972	106766	118629	142355	620
630	8094	10118	12453	15566	17512	23349	29186	35024	42807	51368	70048	87559	105071	116746	140095	630
640	7968	9960	12258	15323	17238	22984	28730	34477	42138	50566	68953	86191	103430	114922	137906	640
650	7845	9807	12070	15087	16973	22631	28288	33946	41490	49788	67892	84865	101838	113154	135784	650
660	7726	9658	11887	14859	16716	22288	27860	33432	40861	49033	66864	83579	100295	111439	133727	660
670	7611	9514	11709	14637	16466	21955	27444	32933	40251	48301	65866	82332	98798	109776	131731	670
680	7499	9374	11537	14422	16224	21632	27040	32448	39659	47591	64897	81121	97345	108162	129794	680
690	7391	9238	11370	14213	15989	21319	26649	31978	39084	46901	63956	79946	95935	106594	127913	690
700	7285	9106	11208	14009	15761	21014	26268	31521	38526	46231	63043	78803	94564	105071	126086	700
710	7182	8978	11050	13812	15539	20718	25898	31077	37984	45580	62155	77694	93232	103591	124310	710
720	7083	8853	10896	13620	15323	20431	25538	30646	37456	44947	61292	76614	91937	102153	122583	720
730	6986	8732	10747	13434	15113	20151	25188	30226	36943	44331	60452	75565	90678	100753	120904	730
740	6891	8614	10602	13252	14909	19878	24848	29818	36444	43732	59635	74544	89453	99392	119270	740
750	6799	8499	10460	13076	14710	19613	24517	29420	35958	43149	58840	73550	88260	98066	117680	750

SIZE	CF-20	CF-21	CF-22	CF-23	CG-24	CG-25	CG-26	CG-27	CG-28	CG-29	CC-30	CC-31	CC-32	CL-33	CL-34	
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DO NOT SELECT TYPES V1, V

CONSTANT SUPPORT SELECTION CHART (LOADS IN kgf)

SIZE TRAVEL	CA-1	CA-2	CA-3	CA-4	CB-5	CB-6	CB-7	CC-8	CC-9	CC-10	CD-11	CD-12	CD-13	CD-14	CD-15	CE-16	CE-17	CE-18	CE-19	TRAVEL
40	74	102	134	187	235	331	426	471	661	853	1129	1506	2006							40
50	59	82	107	150	188	264	341	376	529	682	903	1205	1605	2168	3024					50
60	49	68	89	125	157	220	284	314	441	569	753	1004	1337	1806	2520	3417	4333			60
70	42	58	77	107	134	189	244	269	378	487	645	860	1146	1548	2160	2929	3714	4571	5714	70
80	37	51	67	94	118	165	213	235	331	426	565	753	1003	1355	1890	2563	3250	4000	5000	80
90	33	45	60	83	105	147	190	209	294	379	502	669	892	1204	1680	2278	2889	3556	4444	90
100	30	41	54	75	94	132	171	188	264	341	452	602	802	1084	1512	2050	2600	3200	4000	100
110	27	37	49	68	86	120	155	171	240	310	411	548	730	985	1375	1864	2364	2909	3636	110
120	25	34	45	62	78	110	142	157	220	284	376	502	669	903	1260	1708	2167	2667	3333	120
130	23	31	41	58	72	102	131	145	203	262	347	463	617	834	1163	1577	2000	2462	3077	130
140	21	29	38	54	67	94	122	134	189	244	323	430	573	774	1080	1464	1857	2286	2857	140
150	20	27	36	50	63	88	114	125	176	227	301	402	535	723	1008	1367	1733	2133	2667	150
160	18	26	34	47	59	83	107	118	165	213	282	376	502	677	945	1281	1625	2000	2500	160
170	17	24	32	44	55	78	100	111	156	201	266	354	472	638	890	1206	1529	1882	2353	170
180	16	23	30	42	52	73	95	105	147	190	251	335	446	602	840	1139	1444	1778	2222	180
190	16	21	28	39	50	70	90	99	139	180	238	317	422	570	796	1079	1368	1684	2105	190
200	15	20	27	37	47	66	85	94	132	171	226	301	401	542	756	1025	1300	1600	2000	200
210	14	19	26	36	45	63	81	90	126	162	215	287	382	516	720	976	1238	1524	1905	210
220	13	19	24	34	43	60	78	86	120	155	205	274	365	493	687	932	1182	1455	1818	220
230	13	18	23	33	41	57	74	82	115	148	196	262	349	471	657	891	1130	1391	1739	230
240	12	17	22	31	39	55	71	78	110	142	188	251	334	452	630	854	1083	1333	1667	240
250	12	16	21	30	38	53	68	75	106	136	181	241	321	434	605	820	1040	1280	1600	250
260	11	16	21	29	36	51	66	72	102	131	174	232	309	417	582	788	1000	1231	1538	260
270	11	15	20	28	35	49	63	70	98	126	167	223	297	401	560	759	963	1185	1481	270
280	11	15	19	27	34	47	61	67	94	122	161	215	287	387	540	732	929	1143	1429	280
290	10	14	19	26	32	46	59	65	91	118	156	208	277	374	521	707	897	1103	1379	290
300	10	14	18	25	31	44	57	63	88	114	151	201	267	361	504	683	867	1067	1333	300
310					30	43	55	61	85	110	146	194	259	350	488	661	839	1032	1290	310
320					29	41	53	59	83	107	141	188	251	339	473	641	813	1000	1250	320
330					29	40	52	57	80	103	137	183	243	328	458	621	788	970	1212	330
340					28	39	50	55	78	100	133	177	236	319	445	603	765	941	1176	340
350					27	38	49	54	76	97	129	172	229	310	432	586	743	914	1143	350
360					26	37	47	52	73	95	125	167	223	301	420	569	722	889	1111	360
370					25	36	46	51	71	92	122	163	217	293	409	554	703	865	1081	370
380					25	35	45	50	70	90	119	159	211	285	398	539	684	842	1053	380
390					24	34	44	48	68	87	116	154	206	278	388	526	667	821	1026	390
400					24	33	43	47	66	85	113	151	201	271	378	513	650	800	1000	400
410								46	65	83	110	147	196	264	369	500	634	780	976	410
420								45	63	81	108	143	191	258	360	488	619	762	952	420
430								44	62	79	105	140	187	252	352	477	605	744	930	430
440								43	60	78	103	137	182	246	344	466	591	727	909	440
450								42	59	76	100	134	178	241	336	456	578	711	889	450
460								41	57	74	98	131	174	236	329	446	565	696	870	460
470								40	56	73	96	128	171	231	322	436	553	681	851	470
480								39	55	71	94	125	167	226	315	427	542	667	833	480
490								38	54	70	92	123	164	221	309	418	531	653	816	490
500								38	53	68	90	120	160	217	302	410	520	640	800	500
510											89	118	157	213	297	402	510	627	784	510
520											87	116	154	208	291	394	500	615	769	520
530											85	114	151	204	285	387	491	604	755	530
540											84	112	149	201	280	380	481	593	741	540
550											82	110	146	197	275	373	473	582	727	550
560											81	108	143	194	270	366	464	571	714	560
570											79	106	141	190	265	360	456	561	702	570
580											78	104	138	187	261	353	448	552	690	580
590											77	102	136	184	256	347	441	542	678	590
600											75	100	134	181	252	342	433	533	667	600
610																336	426	525	656	610
620																331	419	516	645	620
630																325	413	508	635	630
640																320	406	500	625	640
650																315	400	492	615	650
660																311	394	485	606	660
670																306	388	478	597	670
680																301	382	471	588	680
690																297	377	464	580	690
700																293	371	457	571	700
710																289	366	451	563	710
720																285	361	444	556	720
730																281	356	438	548	730
740																277	351	432	541	740
750																273	347	427	533	750

SIZE	CA-1	CA-2	CA-3	CA-4	CB-5	CB-6	CB-7	CC-8	CC-9	CC-10	CD-11	CD-12	CD-13	CD-14	CD-15	CE-16	CE-17	CE-18	CE-19	
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CONSTANT SUPPORT SELECTION CHART (LOADS IN kgf)

SIZE	CF-20	CF-21	CF-22	CF-23	CG-24	CG-25	CG-26	CG-27	CG-28	CG-29	CH-30	CH-31	CH-32	CL-33	CL-34	TRAVEL
TRAVEL																TRAVEL
40																40
50																50
60																60
70																70
80	6500	8125														80
90	5778	7222	8889	11111	12500	16667										90
100	5200	6500	8000	10000	11250	15000										100
110	4727	5909	7273	9091	10227	13636	17045									110
120	4333	5417	6667	8333	9375	12500	15625	18750	22917							120
130	4000	5000	6154	7692	8654	11538	14423	17308	21154	25385						130
140	3714	4643	5714	7143	8036	10714	13393	16071	19643	23571						140
150	3467	4333	5333	6667	7500	10000	12500	15000	18333	22000	30000					150
160	3250	4063	5000	6250	7031	9375	11719	14063	17188	20625	28125	35156				160
170	3059	3824	4706	5882	6618	8824	11029	13235	16176	19412	26471	33088	39706	44118	52941	170
180	2889	3611	4444	5556	6250	8333	10417	12500	15278	18333	25000	31250	37500	41667	50000	180
190	2737	3421	4211	5263	5921	7895	9868	11842	14474	17368	23684	29605	35526	39474	47368	190
200	2600	3250	4000	5000	5625	7500	9375	11250	13750	16500	22500	28125	33750	37500	45000	200
210	2476	3095	3810	4762	5357	7143	8929	10714	13095	15714	21429	26786	32143	35714	42857	210
220	2364	2955	3636	4545	5114	6818	8523	10227	12500	15000	20455	25568	30682	34091	40909	220
230	2261	2826	3478	4348	4891	6522	8152	9783	11957	14348	19565	24457	29348	32609	39130	230
240	2167	2708	3333	4167	4688	6250	7813	9375	11458	13750	18750	23438	28125	31250	37500	240
250	2080	2600	3200	4000	4500	6000	7500	9000	11000	13200	18000	22500	27000	30000	36000	250
260	2000	2500	3077	3846	4327	5769	7212	8654	10577	12692	17308	21635	25962	28846	34615	260
270	1926	2407	2963	3704	4167	5556	6944	8333	10185	12222	16667	20833	25000	27778	33333	270
280	1857	2321	2857	3571	4018	5357	6696	8036	9821	11786	16071	20089	24107	26786	32143	280
290	1793	2241	2759	3448	3879	5172	6466	7759	9483	11379	15517	19397	23276	25862	31034	290
300	1733	2167	2667	3333	3750	5000	6250	7500	9167	11000	15000	18750	22500	25000	30000	300
310	1677	2097	2581	3226	3629	4839	6048	7258	8871	10645	14516	18145	21774	24194	29032	310
320	1625	2031	2500	3125	3516	4688	5859	7031	8594	10313	14063	17578	21094	23438	28125	320
330	1576	1970	2424	3030	3409	4545	5682	6818	8333	10000	13636	17045	20455	22727	27273	330
340	1529	1912	2353	2941	3309	4412	5515	6618	8088	9706	13235	16544	19853	22259	26471	340
350	1486	1857	2286	2857	3214	4286	5357	6429	7857	9429	12857	16071	19286	21429	25714	350
360	1444	1806	2222	2778	3125	4167	5208	6250	7639	9167	12500	15625	18750	20833	25000	360
370	1405	1757	2162	2703	3041	4054	5068	6081	7432	8919	12162	15203	18243	20270	24324	370
380	1368	1711	2105	2632	2961	3947	4934	5921	7237	8684	11842	14803	17763	19737	23684	380
390	1333	1667	2051	2564	2885	3846	4808	5769	7051	8462	11538	14423	17308	19231	23077	390
400	1300	1625	2000	2500	2813	3750	4688	5625	6875	8250	11250	14063	16875	18750	22500	400
410	1268	1585	1951	2439	2744	3659	4573	5488	6707	8049	10976	13720	16463	18293	21951	410
420	1238	1548	1905	2381	2679	3571	4464	5357	6548	7857	10714	13393	16071	17857	21429	420
430	1209	1512	1860	2326	2616	3488	4360	5233	6395	7674	10465	13081	15698	17442	20930	430
440	1182	1477	1818	2273	2557	3409	4261	5114	6250	7500	10227	12784	15341	17045	20455	440
450	1156	1444	1778	2222	2500	3333	4167	5000	6111	7333	10000	12500	15000	16667	20000	450
460	1130	1413	1739	2174	2446	3261	4076	4891	5978	7174	9783	12228	14674	16304	19565	460
470	1106	1383	1702	2128	2394	3191	3989	4787	5851	7021	9574	11968	14362	15957	19149	470
480	1083	1354	1667	2083	2344	3125	3906	4688	5729	6875	9375	11719	14063	15625	18750	480
490	1061	1327	1633	2041	2296	3061	3827	4592	5612	6735	9184	11480	13776	15306	18367	490
500	1040	1300	1600	2000	2250	3000	3750	4500	5500	6600	9000	11250	13500	15000	18000	500
510	1020	1275	1569	1961	2206	2941	3676	4412	5392	6471	8824	11029	13235	14706	17647	510
520	1000	1250	1538	1923	2163	2885	3606	4327	5288	6346	8654	10817	12981	14423	17308	520
530	981	1226	1509	1887	2123	2830	3538	4245	5189	6226	8491	10613	12736	14151	16981	530
540	963	1204	1481	1852	2083	2778	3472	4167	5093	6111	8333	10417	12500	13889	16667	540
550	945	1182	1455	1818	2045	2727	3409	4091	5000	6000	8182	10227	12273	13636	16364	550
560	929	1161	1429	1786	2009	2679	3348	4018	4911	5893	8036	10045	12054	13393	16071	560
570	912	1140	1404	1754	1974	2632	3289	3947	4825	5789	7895	9868	11842	13158	15789	570
580	897	1121	1379	1724	1940	2586	3233	3879	4741	5690	7759	9698	11638	12931	15517	580
590	881	1102	1356	1695	1907	2542	3178	3814	4661	5593	7627	9534	11441	12712	15254	590
600	867	1083	1333	1667	1875	2500	3125	3750	4583	5500	7500	9375	11250	12500	15000	600
610	852	1066	1311	1639	1844	2459	3074	3689	4508	5410	7377	9221	11066	12295	14754	610
620	839	1048	1290	1613	1815	2419	3024	3629	4435	5323	7258	9073	10887	12097	14516	620
630	825	1032	1270	1587	1786	2381	2976	3571	4365	5238	7143	8929	10714	11905	14286	630
640	813	1016	1250	1563	1758	2344	2930	3516	4297	5156	7031	8789	10547	11719	14063	640
650	800	1000	1231	1538	1731	2308	2885	3462	4231	5077	6923	8654	10385	11538	13846	650
660	788	985	1212	1515	1705	2273	2841	3409	4167	5000	6818	8523	10227	11364	13636	660
670	776	970	1194	1493	1679	2239	2799	3358	4104	4925	6716	8396	10075	11194	13433	670
680	765	956	1176	1471	1654	2206	2757	3309	4044	4853	6618	8272	9926	11029	13235	680
690	754	942	1159	1449	1630	2174	2717	3261	3986	4783	6522	8152	9783	10870	13043	690
700	743	929	1143	1429	1607	2143	2679	3214	3929	4714	6429	8036	9643	10714	12857	700
710	732	915	1127	1408	1585	2113	2641	3169	3873	4648	6338	7923	9507	10563	12676	710
720	722	903	1111	1389	1563	2083	2604	3125	3819	4583	6250	7813	9375	10417	12500	720
730	712	890	1096	1370	1541	2055	2568	3082	3767	4521	6164	7705	9247	10274	12329	730
740	703	878	1081	1351	1520	2027	2534	3041	3716	4459	6081	7601	9122	10135	12162	740
750	693	867	1067	1333	1500	2000	2500	3000	3667	4400	6000	7500	9000	10000	12000	750

SIZE	CF-20	CF-21	CF-22	CF-23	CG-24	CG-25	CG-26	CG-27	CG-28	CG-29	CC-30	CC-31	CC-32	CL-33	CL-34	
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DO NOT SELECT TYPES V1, V2 OR VFM ABOVE THEBLACK LINE.

DO NOT SELECT TYPES H1 OR VU1 BELOW THEREDLINE.

REMEMBER TO ADD OVERTRAVEL ALLOWANCE TO PIPE MOVEMENT BEFORE SELECTING SUPPORT SIZE.

CA: DIMENSIONS FOR SIZES CA-1 TO CA-4

MOVEMENT DEPENDENT DIMENSIONS				
MOVEMENT PROVIDED mm		40-120	130-210	220-300
TRAVEL RANGE DEPENDENT DIMENSIONS	U	105	105	205
	TA	205	325	446
	TB	135	200	270
	TC	130	130	230
	TD	60	80	100
	TE	135	205	270
	TF	150	215	275
	TG	65	90	110
	TH	65	90	110
	TJ	100	100	128

TOP SUSPENSION DETAILS	
DD	14
AA	30
BB	20
CC	50
EE	6
GG	20
LL	M12

FIXED DIMENSIONS					
FA	155	FQ	75	XE	14
FB	85	FR	180	XF	190
FC	45	FS	180	XG	105
FD	25	FT	105	XH	55
FE	122	FU	35	XJ	150
FF	6	FV	140	XK	200
FG	35	FW	14	XL	14
FH	14	FX	60	XM	75
FJ	20	FY	80	XN	10
FK	180	FZ	180	XP	100
FL	140	XA	245	XQ	104
FM	6	XB	105	XR	100
FN	75	XC	100		
FP	40	XD	140		

SPRING SIZE DEPENDENT DIMENSIONS					
	CA-1	CA-2	CA-3	CA-4	
SA	132	150	162	184	
SB	142	160	172	194	
SC	180	200	210	235	
SD	195	215	225	250	
SE	195	215	225	250	
SF	105	105	105	110	

WEIGHTS (kgf)					
	CA-1	CA-2	CA-3	CA-4	
H1/H2	9	10	10	11	
V1/V2	11	11	12	12	
VU1/VU	11	11	11	12	
HFMT	11	11	12	12	
HFMH	9	9	10	10	
VFM	10	10	10	11	
VFMT	13	13	13	14	
VUB	10	10	11	11	

SINGLE POINT SUSPENSION DIMENSION 'V'							
MOVEMENT PROVIDED mm	ALL SIZES			CA-1	CA-2	CA-3	CA-4
	V1	V3	V2	V2	V2	V2	V2
40	41	45					
50	50	55					
60	59	65	58	61	63	65	
70	68	74	66	70	73	75	
80	76	82	74	78	82	85	
90	83	91	81	86	90	94	
100	91	99	88	94	99	103	
110	98	107	94	102	107	112	
120	106	114	100	109	115	121	
130	TYPES HS AND VS ARE NOT USED ABOVE 120mm TRAVEL			106	116	122	129
140				112	122	130	138
150				117	129	137	146
160				123	135	144	153
170				128	141	151	161
180				132	147	157	169
190				137	153	164	176
200				142	158	170	183
210				146	164	176	190
220				150	169	182	197
230				154	174	188	204
240				158	179	194	210
250				162	183	199	217
260				166	188	205	223
270				170	193	210	229
280				173	197	215	235
290				177	201	220	241
300				180	206	225	247

INSTALLED HEIGHT DIMENSIONS J4 AND J7 ALLOW ± 25 mm ADJUSTMENT.

TAKE-OUT DIMENSIONS A1, A2, A3, J5, J6 AND J8 ALLOW ± 75 mm ADJUSTMENT.

WHERE SEVERE HEADROOM LIMITATIONS EXIST, DIMENSIONS A1, A2 AND A3 CAN BE REDUCED AND DIMENSIONS J5, J6 AND J8 INCREASED AS FOLLOWS BY USE OF A SHORTENED EYEBOLT:

ØX	M12
CHANGE mm	160

NOTE DIA. X IS THREADED ISO METRIC COARSE RIGHT HAND AS STANDARD. NOTE THAT DIMENSIONS A1, A2, A3, J4, J5, J6, J7 AND J8 ARE GIVEN AT ZERO ROTATION, THAT IS WITH THE LEVER IN THE UPPERMOST POSITION.

N.B. DIMENSION TA IS THE MINIMUM FORWARD CLEARANCE REQUIRED.

CA: DIMENSIONS FOR SIZES CA-1 TO CA-4

MOVEMENT PROVIDED mm	ALL SIZES								CA-1				CA-2				CA-3				CA-4			
	ALL			H1 H2	V1 V2	HFM1	HFMH	VUB		VU1 VU2	VFM	VFMT		VU1 VU2	VFM	VFMT		VU1 VU2	VFM	VFMT		VU1 VU2	VFM	VFMT
	C mm	D mm	E mm	A1 mm	A2 mm	J4 mm	J5 mm	J8 mm	ØX mm	A3 mm	J6 mm	J7 mm	ØX mm	A3 mm	J6 mm	J7 mm	ØX mm	A3 mm	J6 mm	J7 mm	ØX mm	A3 mm	J6 mm	J7 mm
	AT ZERO ROTATION								AT 0° ROTATION				AT 0° ROTATION				AT 0° ROTATION				AT 0° ROTATION			
40	54	44	31	479		307	-279	-279	M12	586		422	M12	604		442	M12	616		452	M12	638		477
50	67	55	38	472		314	-272	-272	M12	579		429	M12	597		449	M12	609		459	M12	631		484
60	80	66	46	464	464	322	-264	-264	M12	571	-134	437	M12	589	-114	457	M12	601	-104	467	M12	623	-79	492
70	94	77	54	456	456	330	-256	-256	M12	563	-126	445	M12	581	-106	465	M12	593	-96	475	M12	615	-71	500
80	107	88	61	449	449	337	-249	-249	M12	556	-119	452	M12	574	-99	472	M12	586	-89	482	M12	608	-64	507
90	120	99	69	441	441	345	-241	-241	M12	548	-111	460	M12	566	-91	480	M12	578	-81	490	M12	600	-56	515
100	134	110	77	433	433	353	-233	-233	M12	540	-103	468	M12	558	-83	488	M12	570	-73	498	M12	592	-48	523
110	147	121	84	426	426	360	-226	-226	M12	533	-96	475	M12	551	-76	495	M12	563	-66	505	M12	585	-41	530
120	161	132	92	418	418	368	-218	-218	M12	525	-88	483	M12	543	-68	503	M12	555	-58	513	M12	577	-33	538
130	174	143	100	475	480	396	-185	-185	M12	517	-80	491	M12	535	-60	511	M12	547	-50	521	M12	569	-25	546
140	187	153	107	468	473	403	-178	-178	M12	510	-73	498	M12	528	-53	518	M12	540	-43	528	M12	562	-18	553
150	201	164	115	460	465	411	-170	-170	M12	502	-65	506	M12	520	-45	526	M12	532	-35	536	M12	554	-10	561
160	214	175	123	452	457	419	-162	-162	M12	494	-57	514	M12	512	-37	534	M12	524	-27	544	M12	546	-2	569
170	228	186	130	445	450	426	-155	-155	M12	487	-50	521	M12	505	-30	541	M12	517	-20	551	M12	539	5	576
180	241	197	138	437	442	434	-147	-147	M12	479	-42	529	M12	497	-22	549	M12	509	-12	559	M12	531	13	584
190	254	208	146	429	434	442	-139	-139	M12	471	-34	537	M12	489	-14	557	M12	501	-4	567	M12	523	21	592
200	268	219	154	421	426	450	-131	-131	M12	463	-26	545	M12	481	-6	565	M12	493	4	575	M12	515	29	600
210	281	230	161	414	419	457	-124	-124	M12	456	-19	552	M12	474	1	572	M12	486	11	582	M12	508	36	607
220	294	241	169	476	476	485	-96	-96	M12	476	-11	560	M12	494	9	580	M12	506	19	590	M12	528	44	615
230	308	252	177	468	468	493	-88	-88	M12	468	-3	568	M12	486	17	588	M12	498	27	598	M12	520	52	623
240	321	263	184	461	461	500	-81	-81	M12	461	4	575	M12	479	24	595	M12	491	34	605	M12	513	59	630
250	335	274	192	453	453	508	-73	-73	M12	453	12	583	M12	471	32	603	M12	483	42	613	M12	505	67	638
260	348	285	200	445	445	516	-65	-65	M12	445	20	591	M12	463	40	611	M12	475	50	621	M12	497	75	646
270	361	296	207	438	438	523	-58	-58	M12	438	27	598	M12	456	47	618	M12	468	57	628	M12	490	82	653
280	375	307	215	430	430	531	-50	-50	M12	430	35	606	M12	448	55	626	M12	460	65	636	M12	482	90	661
290	388	318	223	422	422	539	-42	-42	M12	422	43	614	M12	440	63	634	M12	452	73	644	M12	474	98	669
300	401	329	230	415	415	546	-35	-35	M12	415	50	621	M12	433	70	641	M12	445	80	651	M12	467	105	676

CB: DIMENSIONS FOR SIZES CB-5 TO CB-7

MOVEMENT DEPENDENT DIMENSIONS					
MOVEMENT PROVIDED mm		40-120	130-210	220-300	310-400
TRAVEL RANGE DEPENDENT DIMENSIONS	U	105	105	270	270
	TA	209	329	450	583
	TB	140	205	275	350
	TC	130	130	295	295
	TD	70	85	105	120
	TE	140	215	275	350
	TF	155	235	305	370
	TG	80	95	115	135
	TH	80	95	115	135
	TJ	120	120	120	168

TOP SUSPENSION DETAILS	
DD	14
AA	30
BB	20
CC	50
EE	6
GG	20
LL	M12

FIXED DIMENSIONS					
FA	200	FQ	75	XE	14
FB	85	FR	180	XF	190
FC	55	FS	180	XG	105
FD	25	FT	105	XH	55
FE	164	FU	35	XJ	150
FF	6	FV	140	XK	200
FG	35	FW	14	XL	14
FH	14	FX	70	XM	80
FJ	20	FY	90	XN	10
FK	180	FZ	180	XP	110
FL	140	XA	265	XQ	104
FM	6	XB	105	XR	120
FN	80	XC	120		
FP	50	XD	140		

SPRING SIZE DEPENDENT DIMENSIONS			
	CB-5	CB-6	CB-7
SA	197	172	184
SB	207	182	194
SC	260	235	245
SD	275	250	260
SE	275	250	260
SF	130	130	130

WEIGHTS (kgf)			
	CB-5	CB-6	CB-7
H1/H2	16	16	16
V1/V2	18	18	18
VU1/VU	19	19	19
HFMH	18	18	18
HFMH	16	16	16
VFM	17	17	17
VFMT	20	20	20
VUB	19	19	19

SINGLE POINT SUSPENSION DIMENSION 'V'					
MOVEMENT PROVIDED mm	ALL SIZES		CB-5	CB-6	CB-7
	S1	V3	V2	V2	V2
40	42	47			
50	52	58			
60	61	69			
70	71	78			
80	79	88	82	87	88
90	88	98	91	96	99
100	97	107	100	106	109
110	106	116	108	115	118
120	114	125	116	124	128
130	TYPES HS AND VS ARE NOT USED ABOVE 120mm TRAVEL		124	133	138
140			131	142	147
150			139	151	156
160			146	159	165
170			153	167	174
180			160	175	182
190			167	183	191
200			173	191	199
210			180	199	208
220			186	206	216
230			192	214	224
240			198	221	232
250			203	228	240
260			209	235	247
270			215	242	255
280			220	249	262
290			225	255	270
300			230	262	277
310			235	268	284
320			240	274	291
330			245	281	298
340			250	287	305
350			255	293	311
360			259	298	318
370			264	304	324
380			268	310	331
390			272	316	337
400			277	321	343

INSTALLED HEIGHT DIMENSIONS J4 AND J7 ALLOW ± 25 mm ADJUSTMENT.

TAKE-OUT DIMENSIONS A1, A2, A3, J5, J6 AND J8 ALLOW ± 75 mm ADJUSTMENT.

WHERE SEVERE HEADROOM LIMITATIONS EXIST, DIMENSIONS A1, A2 AND A3 CAN BE REDUCED AND DIMENSIONS J5, J6 AND J8 INCREASED AS FOLLOWS BY USE OF A SHORTENED EYEBOLT:

ØX	M12
CHANGE mm	160

NOTE DIA. X IS THREADED ISO METRIC COARSE RIGHT HAND AS STANDARD. NOTE THAT DIMENSIONS A1, A2, A3, J4, J5, J6, J7 AND J8 ARE GIVEN AT ZERO ROTATION, THAT IS WITH THE LEVER IN THE UPPERMOST POSITION.

N.B. DIMENSION TA IS THE MINIMUM FORWARD CLEARANCE REQUIRED.

CB: DIMENSIONS FOR SIZES CB-5 TO CB-7

MOVEMENT PROVISED mm	ALL SIZES								CB-5				CB-6				CB-7				
	ALL				H1 H2	V1 V2	HFMT	HFMH	VUB		VU1 VU2	VFM	VFMT		VU1 VU2	VFM	VFMT		VU1 VU2	VFM	VFMT
	C mm	D mm	E mm	A1 mm	A2 mm	J4 mm	J5 mm	J8 mm	ØX mm	A3 mm	J6 mm	J7 mm	ØX mm	A3 mm	J6 mm	J7 mm	ØX mm	A3 mm	J6 mm	J7 mm	
	AT ZERO ROTATION								AT 0° ROTATION				AT 0° ROTATION				AT 0° ROTATION				
40	54	44	31	484		333	-264	-264	M12	671		518	M12	646		493	M12	658		503	
50	67	55	38	477		340	-257	-257	M12	664		525	M12	639		500	M12	651		510	
60	80	66	46	469		348	-249	-249	M12	656		533	M12	631		508	M12	643		518	
70	94	77	54	461		356	-241	-241	M12	648		541	M12	623		516	M12	635		526	
80	107	88	61	454	454	363	-234	-234	M12	641	-39	548	M12	616	-64	523	M12	628	-54	533	
90	120	99	69	446	446	371	-226	-226	M12	633	-31	556	M12	608	-56	531	M12	620	-46	541	
100	134	110	77	438	438	379	-218	-218	M12	625	-23	564	M12	600	-48	539	M12	612	-38	549	
110	147	121	84	431	431	386	-211	-211	M12	618	-16	571	M12	593	-41	546	M12	605	-31	556	
120	161	132	92	423	423	394	-203	-203	M12	610	-8	579	M12	585	-33	554	M12	597	-23	564	
130	174	143	100	480	490	411	-180	-180	M12	602	0	581	M12	577	-25	556	M12	589	-15	566	
140	187	153	107	473	483	418	-173	-173	M12	595	7	588	M12	570	-18	563	M12	582	-8	573	
150	201	164	115	465	475	426	-165	-165	M12	587	15	596	M12	562	-10	571	M12	574	0	581	
160	214	175	123	457	467	434	-157	-157	M12	579	23	604	M12	554	-2	579	M12	566	8	589	
170	228	186	130	450	460	441	-150	-150	M12	572	30	611	M12	547	5	586	M12	559	15	596	
180	241	197	138	442	452	449	-142	-142	M12	564	38	619	M12	539	13	594	M12	551	23	604	
190	254	208	146	434	444	457	-134	-134	M12	556	46	627	M12	531	21	602	M12	543	31	612	
200	268	219	154	426	436	465	-126	-126	M12	548	54	635	M12	523	29	610	M12	535	39	620	
210	281	230	161	419	429	472	-119	-119	M12	541	61	642	M12	516	36	617	M12	528	46	627	
220	294	241	169	481	481	500	-91	-91	M12	533	69	650	M12	508	44	625	M12	520	54	635	
230	308	252	177	473	473	508	-83	-83	M12	525	77	658	M12	500	52	633	M12	512	62	643	
240	321	263	184	466	466	515	-76	-76	M12	518	84	665	M12	493	59	640	M12	505	69	650	
250	335	274	192	458	458	523	-68	-68	M12	510	92	673	M12	485	67	648	M12	497	77	658	
260	348	285	200	450	450	531	-60	-60	M12	502	100	681	M12	477	75	656	M12	489	85	666	
270	361	296	207	443	443	538	-53	-53	M12	495	107	688	M12	470	82	663	M12	482	92	673	
280	375	307	215	435	435	546	-45	-45	M12	487	115	696	M12	462	90	671	M12	474	100	681	
290	388	318	223	427	427	554	-37	-37	M12	479	123	704	M12	454	98	679	M12	466	108	689	
300	401	329	230	420	420	561	-30	-30	M12	472	130	711	M12	447	105	686	M12	459	115	696	
310	415	340	238	487	487	584	-2	-2	M12	512	138	719	M12	487	113	694	M12	499	123	704	
320	428	351	246	479	479	592	6	6	M12	504	146	727	M12	479	121	702	M12	491	131	712	
330	442	362	253	472	472	599	13	13	M12	497	153	734	M12	472	128	709	M12	484	138	719	
340	455	373	261	464	464	607	21	21	M12	489	161	742	M12	464	136	717	M12	476	146	727	
350	468	384	269	456	456	615	29	29	M12	481	169	750	M12	456	144	725	M12	468	154	735	
360	482	395	276	449	449	622	36	36	M12	474	176	757	M12	449	151	732	M12	461	161	742	
370	495	406	284	441	441	630	44	44	M12	466	184	765	M12	441	159	740	M12	453	169	750	
380	509	417	292	433	433	638	52	52	M12	458	192	773	M12	433	167	748	M12	445	177	758	
390	522	428	299	426	426	645	59	59	M12	451	199	780	M12	426	174	755	M12	438	184	765	
400	535	439	307	418	418	653	67	67	M12	443	207	788	M12	418	182	763	M12	430	192	773	

CC: DIMENSIONS FOR SIZES CC-8 TO CC-10

MOVEMENT DEPENDENT DIMENSIONS						
MOVEMENT PROVIDED mm	40-120		130-210		220-300	
	270		270		270	
TRAVEL RANGE DEPENDENT DIMENSIONS	U	120	120	270	270	270
	TA	213	306	454	587	721
	TB	155	195	280	355	430
	TC	145	145	295	295	295
	TD	80	90	110	125	145
	TE	155	195	280	355	430
	TF	155	225	315	390	455
	TG	90	100	120	140	165
	TH	90	100	120	140	165
	TJ	155	155	155	155	207
	DD	14	14	14	14	14
	AA	30	30	30	30	30
TOP SUSPENSION DETAILS	CC-8	BB	20	20	20	20
		CC	50	50	50	50
		EE	6	6	6	6
		GG	20	20	20	20
		LL	M12	M12	M12	M12
		DD	18	14	14	14
	CC-9	AA	36	30	30	30
		BB	30	20	20	20
		CC	50	50	50	50
		EE	6	6	6	6
		GG	25	20	20	20
		LL	M16	M12	M12	M12
CC-10	DD	18	14	14	14	14
	AA	36	30	30	30	30
	BB	30	20	20	20	20
	CC	50	50	50	50	50
	EE	6	6	6	6	6
	GG	25	20	20	20	20

FIXED DIMENSIONS					
FA	250	FQ	75	XE	14
FB	89	FR	180	XF	220
FC	65	FS	195	XG	120
FD	50	FT	120	XH	90
FE	198	FU	35	XJ	180
FF	8	FV	140	XK	250
FG	35	FW	14	XL	14
FH	14	FX	85	XM	115
FJ	20	FY	120	XN	12
FK	180	FZ	220	XP	145
FL	140	XA	330	XQ	118
FM	8	XB	120	XR	155
FN	115	XC	170		
FP	60	XD	180		

SPRING SIZE DEPENDENT DIMENSIONS			
	CC-8	CC-9	CC-10
SA	211	233	253
SB	223	245	265
SC	280	305	325
SD	300	325	345
SE	300	325	345
SF	175	175	180

WEIGHTS (kgf)			
	CC-8	CC-9	CC-10
H1/H2	24	25	26
V1/V2	25	27	28
VU1/VU2	27	28	30
HFM	27	28	30
HFMH	23	24	26
VFM	24	25	27
VFMT	29	30	32
VUB	28	29	31

SINGLE POINT SUSPENSION DIMENSION 'V'					
MOVEMENT PROVIDED mm	ALL SIZES		CC-8	CC-9	CC-10
	V1	V3	V2	V2	V2
40	43	48			
50	53	60			
60	63	71			
70	73	81	75	77	78
80	83	92	85	87	89
90	92	102	94	98	99
100	101	112	103	107	110
110	110	123	112	117	120
120	119	132	121	127	130
130			130	136	139
140			139	145	149
150			147	155	159
160			155	163	168
170			163	172	177
180			171	181	187
190			179	190	196
200			186	198	204
210			193	206	213
220			201	214	222
230			208	222	231
240			215	230	239
250			222	238	247
260			228	246	256
270			235	253	264
280			242	261	272
290			248	268	280
300			254	275	287
310			260	282	295
320			266	290	303
330			272	296	310
340			278	303	318
350			284	310	325
360			290	317	333
370			295	323	340
380			301	330	347
390			306	336	354
400			311	343	361
410			317	349	368
420			322	355	375
430			327	361	381
440			332	367	388
450			337	373	395
460			342	379	401
470			346	385	407
480			351	390	414
490			356	396	420
500			360	401	426

TYPES HS AND VIS ARE NOT USED ABOVE 120mm TRAVEL

INSTALLED HEIGHT DIMENSIONS J4 AND J7 ALLOW ± 25 mm ADJUSTMENT.

TAKE-OUT DIMENSIONS A1, A2, A3, J5, J6 AND J8 ALLOW ± 75 mm ADJUSTMENT.

WHERE SEVERE HEADROOM LIMITATIONS EXIST, DIMENSIONS A1, A2 AND A3 CAN BE REDUCED AND DIMENSIONS J5, J6 AND J8 INCREASED AS FOLLOWS BY USE OF A SHORTENED EYEBOLT:

ØX	M12	M16
CHANGE mm	160	160

NOTE DIA. X IS THREADED ISO METRIC COARSE RIGHT HAND AS STANDARD. NOTE THAT DIMENSIONS A1, A2, A3, J4, J5, J6, J7 AND J8 ARE GIVEN AT ZERO ROTATION, THAT IS WITH THE LEVER IN THE UPPERMOST POSITION.

N.B. DIMENSION TA IS THE MINIMUM FORWARD CLEARANCE REQUIRED.

CC: DIMENSIONS FOR SIZES CC-8 TO CC-10

MOVEMENT PROVIDED mm	ALL SIZES								CC-8				CC-9				CC-10			
	ALL			H1 H2	V1 V2	HFMT	HFMH	VUB		VU1 VU2	VFM	VFMT		VU1 VU2	VFM	VFMT		VU1 VU2	VFM	VFMT
	C mm	D mm	E mm	A1 mm	A2 mm	J4 mm	J5 mm	J8 mm	ØX mm	A3 mm	J6 mm	J7 mm	ØX mm	A3 mm	J6 mm	J7 mm	ØX mm	A3 mm	J6 mm	J7 mm
	AT ZERO ROTATION								AT 0° ROTATION				AT 0° ROTATION				AT 0° ROTATION			
40	54	44	31	499		387	-254	-254	M12	722		582	M16	744		607	M16	764		627
50	67	55	38	492		394	-247	-247	M12	715		589	M12	737		614	M16	757		634
60	80	66	46	484		402	-239	-239	M12	707		597	M12	729		622	M16	749		642
70	94	77	54	476	476	410	-231	-231	M12	699	-21	605	M12	721	4	630	M12	741	24	650
80	107	88	61	469	469	417	-224	-224	M12	692	-14	612	M12	714	11	637	M12	734	31	657
90	120	99	69	461	461	425	-216	-216	M12	684	-6	620	M12	706	19	645	M12	726	39	665
100	134	110	77	453	453	433	-208	-208	M12	676	2	628	M12	698	27	653	M12	718	47	673
110	147	121	84	446	446	440	-201	-201	M12	669	9	635	M12	691	34	660	M12	711	54	680
120	161	132	92	438	438	448	-193	-193	M12	661	17	643	M12	683	42	668	M12	703	62	688
130	174	143	100	430	430	462	-175	-175	M12	653	25	647	M12	675	50	672	M12	695	70	692
140	187	153	107	463	463	469	-168	-168	M12	646	32	654	M12	668	57	679	M12	688	77	699
150	201	164	115	455	455	477	-160	-160	M12	638	40	662	M12	660	65	687	M12	680	85	707
160	214	175	123	447	447	485	-152	-152	M12	630	48	670	M12	652	73	695	M12	672	93	715
170	228	186	130	440	440	492	-145	-145	M12	623	55	677	M12	645	80	702	M12	665	100	722
180	241	197	138	432	432	500	-137	-137	M12	615	63	685	M12	637	88	710	M12	657	108	730
190	254	208	146	424	424	508	-129	-129	M12	607	71	693	M12	629	96	718	M12	649	116	738
200	268	219	154	501	501	530	-101	-101	M12	599	79	695	M12	621	104	720	M12	641	124	740
210	281	230	161	494	494	537	-94	-94	M12	592	86	702	M12	614	111	727	M12	634	131	747
220	294	241	169	486	486	545	-86	-86	M12	584	94	710	M12	606	119	735	M12	626	139	755
230	308	252	177	478	478	553	-78	-78	M12	576	102	718	M12	598	127	743	M12	618	147	763
240	321	263	184	471	471	560	-71	-71	M12	569	109	725	M12	591	134	750	M12	611	154	770
250	335	274	192	463	463	568	-63	-63	M12	561	117	733	M12	583	142	758	M12	603	162	778
260	348	285	200	455	455	576	-55	-55	M12	553	125	741	M12	575	150	766	M12	595	170	786
270	361	296	207	448	448	583	-48	-48	M12	546	132	748	M12	568	157	773	M12	588	177	793
280	375	307	215	440	440	591	-40	-40	M12	538	140	756	M12	560	165	781	M12	580	185	801
290	388	318	223	432	432	599	-32	-32	M12	530	148	764	M12	552	173	789	M12	572	193	809
300	401	329	230	425	425	606	-25	-25	M12	523	155	771	M12	545	180	796	M12	565	200	816
310	415	340	238	492	492	629	3	3	M12	515	163	779	M12	537	188	804	M12	557	208	824
320	428	351	246	484	484	637	11	11	M12	507	171	787	M12	529	196	812	M12	549	216	832
330	442	362	253	477	477	644	18	18	M12	500	178	794	M12	522	203	819	M12	542	223	839
340	455	373	261	469	469	652	26	26	M12	492	186	802	M12	514	211	827	M12	534	231	847
350	468	384	269	461	461	660	34	34	M12	484	194	810	M12	506	219	835	M12	526	239	855
360	482	395	276	454	454	667	41	41	M12	477	201	817	M12	499	226	842	M12	519	246	862
370	495	406	284	446	446	675	49	49	M12	469	209	825	M12	491	234	850	M12	511	254	870
380	509	417	292	438	438	683	57	57	M12	461	217	833	M12	483	242	858	M12	503	262	878
390	522	428	299	431	431	690	64	64	M12	454	224	840	M12	476	249	865	M12	496	269	885
400	535	439	307	423	423	698	72	72	M12	446	232	848	M12	468	257	873	M12	488	277	893
410	549	449	315	490	490	726	105	105	M12	490	240	856	M12	512	265	881	M12	532	285	901
420	562	460	322	483	483	733	112	112	M12	483	247	863	M12	505	272	888	M12	525	292	908
430	575	471	330	475	475	741	120	120	M12	475	255	871	M12	497	280	896	M12	517	300	916
440	589	482	338	467	467	749	128	128	M12	467	263	879	M12	489	288	904	M12	509	308	924
450	602	493	345	460	460	756	135	135	M12	460	270	886	M12	482	295	911	M12	502	315	931
460	616	504	353	452	452	764	143	143	M12	452	278	894	M12	474	303	919	M12	494	323	939
470	629	515	361	444	444	772	151	151	M12	444	286	902	M12	466	311	927	M12	486	331	947
480	642	526	368	437	437	779	158	158	M12	437	293	909	M12	459	318	934	M12	479	338	954
490	656	537	376	429	429	787	166	166	M12	429	301	917	M12	451	326	942	M12	471	346	962
500	669	548	384	421	421	795	174	174	M12	421	309	925	M12	443	334	950	M12	463	354	970

CD: DIMENSIONS FOR SIZES CD-11 TO CD-15

MOVEMENT DEPENDENT DIMENSIONS								
MOVEMENT PROVIDED mm		40-80	90-160	170-220	230-300	310-400	410-500	510-600
TRAVEL RANGE DEPENDENT DIMENSIONS	U	155	155	155	155	345	345	345
	TA	188	291	368	470	599	727	855
	TB	200	200	235	295	365	435	510
	TC	205	205	205	205	370	370	370
	TD	115	115	115	130	145	165	180
	TE		200	255	315	375	435	510
	TF		230	280	345	425	505	580
	TG	130	130	130	145	160	180	195
	TH	130	130	130	145	160	180	195
	TJ	195	195	195	195	195	195	226
TOP SUSPENSION DETAILS	CD-11	DD	22	14	14	14	14	14
		AA	50	30	30	30	30	30
		BB	35	20	20	20	20	20
		CC	60	50	50	50	50	50
		EE	10	6	6	6	6	6
		GG	30	20	20	20	20	20
	CD-12	LL	M20	M12	M12	M12	M12	M12
		DD	22	18	14	14	14	14
		AA	50	36	30	30	30	30
		BB	35	30	20	20	20	20
		CC	60	50	50	50	50	50
		EE	10	6	6	6	6	6
	CD-13	GG	30	25	20	20	20	20
		LL	M20	M16	M12	M12	M12	M12
		DD	26	18	18	14	14	14
		AA	60	36	36	30	30	30
		BB	45	30	30	20	20	20
		CC	80	50	50	50	50	50
	CD-14	EE	10	6	6	6	6	6
		GG	35	30	25	25	20	20
		LL	M24	M20	M16	M16	M12	M12
		DD	26	22	18	18	14	14
		AA	60	50	36	36	30	30
		BB	45	35	30	30	20	20
	CD-15	CC	80	60	50	50	50	50
		EE	10	10	6	6	6	6
		GG	35	30	25	25	20	20
		LL	M24	M20	M16	M16	M12	M12
		DD	33	26	22	22	18	18
		AA	70	60	50	50	36	36
	CD-16	BB	55	45	35	35	30	30
		CC	100	80	60	60	50	50
		EE	12	10	10	10	6	6
		GG	40	35	30	30	25	25
		LL	M30	M24	M20	M20	M16	M16
		DD	33	26	22	22	18	18

FIXED DIMENSIONS

FA	330	FQ	100	XE	18
FB	115	FR	225	XF	270
FC	95	FS	240	XG	155
FD	51	FT	155	XH	110
FE	250	FU	35	XJ	220
FF	10	FV	175	XK	315
FG	35	FW	18	XL	18
FH	18	FX	105	XM	155
FJ	25	FY	160	XN	20
FK	225	FZ	300	XP	190
FL	175	XA	415	XQ	148
FM	10	XB	155	XR	195
FN	155	XC	210		
FP	90	XD	250		

SPRING SIZE DEPENDENT DIMENSIONS

	CD-11	CD-12	CD-13	CD-14	CD-15
SA	264	286	312	351	400
SB	284	306	332	371	420
SC	365	390	415	455	505
SD	385	410	435	475	525
SE	385	410	435	475	525
SF	210	210	215	215	220

WEIGHTS (kgf)

	CD-11	CD-12	CD-13	CD-14	CD-15
H1/H2	55	55	60	65	75
V1/V2	60	60	65	70	80
VU1/VU2	60	65	70	75	80
HFMT	60	65	70	75	80
HFMH	50	55	60	65	70
VFM	55	55	60	65	75
VFMT	65	70	75	80	85
VUB	60	65	70	75	80

SINGLE POINT SUSPENSION DIMENSION 'V'

MOVEMENT PROVIDED mm	ALL SIZES		CD-11	CD-12	CD-13	CD-14	CD-15
	V1	V3	V2	V2	V2	V2	V2
40	43	48					
50	53	60					
60	63	71					
70	73	82					
80	82	93					
90	92	104	95				
100	101	114	104	107	110	112	113
110	111	124	113	117	120	122	124
120	120	135	122	126	130	133	135
130	129	145	131	136	139	143	145
140	138	155	140	145	149	153	156
150	147	165	148	154	159	163	166
160	155	174	156	163	168	173	176
170			164	172	177	182	187
180			172	180	187	192	197
190			180	189	196	202	207
200			188	197	205	211	217
210			195	206	213	221	226
220			203	214	222	230	236
230			210	222	231	239	246
240			217	230	239	248	255
250			224	237	248	257	265
260			231	245	256	266	274
270			238	252	264	275	284
280			245	260	272	283	293
290			251	267	280	292	302
300			258	274	288	300	311
310			264	282	296	309	320
320			270	289	304	317	329
330			276	295	311	325	338
340			282	302	319	334	347
350			288	309	326	342	355
360			294	316	333	350	364
370			300	322	341	358	373
380			305	329	348	366	381
390			311	335	355	373	389
400			316	341	362	381	398
410			322	348	369	389	406
420			327	354	376	396	414
430			332	360	382	404	422
440			337	366	389	411	431
450			343	372	396	418	439
460			348	377	402	426	447
470			353	383	409	433	454
480			357	389	415	440	462
490			362	394	422	447	470
500			367	400	428	454	478
510			372	406	434	461	485
520			376	411	440	468	493
530			381	416	446	475	501
540			385	422	452	482	508
550			390	427	458	488	516
560			394	432	464	495	523
570			399	437	470	502	530
580			403	442	476	508	537
590			407	447	482	515	545
600			411	452	487	521	552

TYPES H1 AND VU1 ARE NOT USED ABOVE 160mm TRAVEL

INSTALLED HEIGHT DIMENSIONS J4 AND J7 ALLOW ± 25 mm ADJUSTMENT.

TAKE-OUT DIMENSIONS A1, A2, A3, J5, J6 AND J8 ALLOW ± 75 mm ADJUSTMENT.

WHERE SEVERE HEADROOM LIMITATIONS EXIST, DIMENSIONS A1, A2 AND A3 CAN BE REDUCED AND DIMENSIONS J5, J6 AND J8 INCREASED AS FOLLOWS BY USE OF A SHORTENED EYEBOLT:

ØX	M12	M16	M20	M24	M30
CHANGE mm	160	160	140	140	120

NOTE DIA. X IS THREADED ISO METRIC COARSE RIGHT HAND AS STANDARD.

NOTE THAT DIMENSIONS A1, A2, A3, J4, J5, J6, J7 AND J8 ARE GIVEN AT ZERO ROTATION, THAT IS WITH THE LEVER IN THE UPPERMOST POSITION.

N.B. DIMENSION TA IS THE MINIMUM FORWARD CLEARANCE REQUIRED.

CD: DIMENSIONS FOR SIZES CD-11 TO CD-15

MOVEMENT PROVIDED mm	ALL SIZES								CD-11				CD-12				CD-13				CD-14				CD-15				
	ALL				H1 H2	V1 V2	HFMT	HFVH	VUB	ØX mm	VU1 VU2	VFM	VFMT	ØX mm	VU1 VU2	VFM	VFMT	ØX mm	VU1 VU2	VFM	VFMT	ØX mm	VU1 VU2	VFM	VFMT	ØX mm	VU1 VU2	VFM	VFMT
	C mm	D mm	E mm	A1 mm	A2 mm	J4 mm	J5 mm	J8 mm	A3 mm	J6 mm	J7 mm	A3 mm	J6 mm	J7 mm	A3 mm	J6 mm	J7 mm	A3 mm	J6 mm	J7 mm	A3 mm	J6 mm	J7 mm	A3 mm	J6 mm	J7 mm	A3 mm	J6 mm	J7 mm
	AT ZERO ROTATION								AT 0° ROTATION				AT 0° ROTATION				AT 0° ROTATION				AT 0° ROTATION								
40	54	44	31	544		495	-214	-214	M20	823		735	M20	845		760	M24	871		785									
50	67	55	38	537		502	-207	-207	M16	816		742	M20	838		767	M24	864		792	M24	903		832	M30	952		882	
60	80	66	46	529		510	-199	-199	M16	808		750	M16	830		775	M20	856		800	M24	895		840	M30	944		890	
70	94	77	54	521		518	-191	-191	M16	800		758	M16	822		783	M20	848		808	M20	887		848	M24	936		898	
80	107	88	61	514		525	-184	-184	M16	793		765	M16	815		790	M16	841		815	M20	880		855	M24	929		905	
90	120	99	69	506	506	526	-176	-176	M12	785	79	766	M16	807		791	M16	833		816	M20	872		856	M24	921		906	
100	134	110	77	498	498	534	-168	-168	M12	777	87	774	M16	799	112	799	M16	825	137	824	M20	864	177	864	M20	913	227	914	
110	147	121	84	491	491	541	-161	-161	M12	770	94	781	M16	792	119	806	M16	818	144	831	M16	857	184	871	M20	906	234	921	
120	161	132	92	483	483	549	-153	-153	M12	762	102	789	M12	784	127	814	M16	810	152	839	M16	849	192	879	M20	898	242	929	
130	174	143	100	475	475	557	-145	-145	M12	754	110	797	M12	776	135	822	M16	802	160	847	M16	841	200	887	M20	890	250	937	
140	187	153	107	468	468	564	-138	-138	M12	747	117	804	M12	769	142	829	M16	795	167	854	M16	834	207	894	M20	883	257	944	
150	201	164	115	460	460	572	-130	-130	M12	739	125	812	M12	761	150	837	M16	787	175	862	M16	826	215	902	M16	875	265	952	
160	214	175	123	452	452	580	-122	-122	M12	731	133	820	M12	753	158	845	M12	779	183	870	M16	818	223	910	M16	867	273	960	
170	228	186	130	480	500	580	-115	-115	M12	724	140	820	M12	746	165	845	M12	772	190	870	M16	811	230	910	M16	860	280	960	
180	241	197	138	472	492	588	-107	-107	M12	716	148	828	M12	738	173	853	M12	764	198	878	M16	803	238	918	M16	852	288	968	
190	254	208	146	464	484	596	-99	-99	M12	708	156	836	M12	730	181	861	M12	756	206	886	M16	795	246	926	M16	844	296	976	
200	268	219	154	456	476	604	-91	-91	M12	700	164	844	M12	722	189	869	M12	748	214	894	M16	787	254	934	M16	836	304	984	
210	281	230	161	449	469	611	-84	-84	M12	693	171	851	M12	715	196	876	M12	741	221	901	M12	780	261	941	M16	829	311	991	
220	294	241	169	441	461	619	-76	-76	M12	685	179	859	M12	707	204	884	M12	733	229	909	M12	772	269	949	M16	821	319	999	
230	308	252	177	493	513	642	-53	-53	M12	677	187	867	M12	699	212	892	M12	725	237	917	M12	764	277	957	M16	813	327	1007	
240	321	263	184	486	506	649	-46	-46	M12	670	194	874	M12	692	219	899	M12	718	244	924	M12	757	284	964	M16	806	334	1014	
250	335	274	192	478	498	657	-38	-38	M12	662	202	882	M12	684	227	907	M12	710	252	932	M12	749	292	972	M16	798	342	1022	
260	348	285	200	470	490	665	-30	-30	M12	654	210	890	M12	676	235	915	M12	702	260	940	M12	741	300	980	M16	790	350	1030	
270	361	296	207	463	483	672	-23	-23	M12	647	217	897	M12	669	242	922	M12	695	267	947	M12	734	307	987	M16	783	357	1037	
280	375	307	215	455	475	680	-15	-15	M12	639	225	905	M12	661	250	930	M12	687	275	955	M12	726	315	995	M16	775	365	1045	
290	388	318	223	447	467	688	-7	-7	M12	631	233	913	M12	653	258	938	M12	679	283	963	M12	718	323	1003	M12	767	373	1053	
300	401	329	230	440	460	695	0	0	M12	624	240	920	M12	646	265	945	M12	672	290	970	M12	711	330	1010	M12	760	380	1060	
310	415	340	238	502	512	718	23	23	M12	616	248	928	M12	638	273	953	M12	664	298	978	M12	703	338	1018	M12	752	388	1068	
320	428	351	246	494	504	726	31	31	M12	608	256	936	M12	630	281	961	M12	656	306	986	M12	695	346	1026	M12	744	396	1076	
330	442	362	253	487	497	733	38	38	M12	601	263	943	M12	623	288	968	M12	649	313	993	M12	688	353	1033	M12	737	403	1083	
340	455	373	261	479	489	741	46	46	M12	593	271	951	M12	615	296	976	M12	641	321	1001	M12	680	361	1041	M12	729	411	1091	
350	468	384	269	471	481	749	54	54	M12	585	279	959	M12	607	304	984	M12	633	329	1009	M12	672	369	1049	M12	721	419	1099	
360	482	395	276	464	474	756	61	61	M12	578	286	966	M12	600	311	991	M12	626	336	1016	M12	665	376	1056	M12	714	426	1106	
370	495	406	284	456	466	764	69	69	M12	570	294	974	M12	592	319	999	M12	618	344	1024	M12	657	384	1064	M12	706	434	1114	
380	509	417	292	448	458	772	77	77	M12	562	302	982	M12	584	327	1007	M12	610	352	1032	M12	649	392	1072	M12	698	442	1122	
390	522	428	299	441	451	779	84	84	M12	555	309	989	M12	577	334	1014	M12	603	359	1039	M12	642	399	1079	M12	691	449	1129	
400	535	439	307	433	443	787	92	92	M12	547	317	997	M12	569	342	1022	M12	595	367	1047	M12	634	407	1087	M12	683	457	1137	
410	549	449	315	495	495	812	120	120	M12	539	325	1002	M12	561	350	1027	M12	587	375	1052	M12	626	415	1092	M12	675	465	1142	
420	562	460	322	488	488	819	127	127	M12	532	332	1009	M12	554	357	1034	M12	580	382	1059	M12	619	422	1099	M12	668	472	1149	
430	575	471	330	480	480	827	135	135	M12	524	340	1017	M12	546	365	1042	M12	572	390	1067	M12	611	430	1107	M12	660	480	1157	
440	589	482	338	472	472	835	143	143	M12	516	348	1025	M12	538	373	1050	M12	564	398	1075	M12	603	438	1115	M12	652	488	1165	
450	602	493	345	465	465	842	150	150	M12	509	355	1032	M12	531	380	1057	M12	557	405	1082	M12	596	445	1122	M12	645	495	1172	
460	616	504	353	457	457	850	158	158	M12	501	363	1040	M12	523	388	1065	M12	549	413	1090	M12	588	453	1130	M12	637	503	1180	
470	629	515	361	449	449	858	166	166	M12	493	371	1048	M12	515	396	1073	M12	541	421	1098	M12	580	461	1138	M12	629	511		

CE: DIMENSIONS FOR SIZES CE-16 TO CE-19

MOVEMENT DEPENDENT DIMENSIONS									
MOVEMENT PROVIDED mm	60-100	110-170	180-240	250-330	340-400	410-500	510-600	610-750	
TRAVEL RANGE DEPENDENT DIMENSIONS	U	235	235	235	235	235	450	450	450
	TA	218	310	401	519	610	741	872	1068
	TB	280	280	280	325	375	450	525	635
	TC	300	300	300	300	300	480	480	480
	TD	135	135	135	160	160	180	200	225
	TE	230	230	280	350	400	475	525	635
	TF	300	300	300	390	450	530	610	720
	TG	150	150	150	175	175	195	215	240
	TH	150	150	150	175	175	195	215	240
	TJ	255	255	255	255	255	255	255	255
TOP SUSPENSION DETAILS	CE-16	DD	33	26	22	22	22	22	22
		AA	70	60	50	50	50	50	50
		BB	55	45	35	35	35	35	35
		CC	100	80	60	60	60	60	60
		EE	12	10	10	10	10	10	10
		GG	40	35	30	30	30	30	30
	CE-17	LL	M30	M24	M20	M20	M20	M20	M20
		DD	40	33	26	22	22	22	22
		AA	80	70	50	50	50	50	50
		BB	55	55	35	35	35	35	35
		CC	110	100	80	80	80	80	80
		EE	15	12	10	10	10	10	10
	CE-18	GG	45	40	30	30	30	30	30
		LL	M36	M30	M20	M20	M20	M20	M20
		DD	40	33	26	26	22	22	22
		AA	80	70	60	60	60	50	50
		BB	55	55	45	45	35	35	35
		CC	110	100	80	80	80	60	60
	CE-19	GG	45	40	35	35	30	30	30
		LL	M36	M30	M24	M24	M20	M20	M20
		DD	46	33	26	26	22	22	22
		AA	90	70	60	60	50	50	50
		BB	75	55	45	45	35	35	35
		CC	130	100	80	80	80	60	60
		EE	15	12	10	10	10	10	10
		GG	60	40	35	35	30	10	10
		LL	M42	M30	M24	M24	M20	M20	M20

FIXED DIMENSIONS

FA	410	FQ	120	XE	22
FB	141	FR	265	XF	320
FC	110	FS	360	XG	235
FD	92	FT	235	XH	170
FE	319	FU	65	XJ	260
FF	12	FV	205	XK	465
FG	65	FW	22	XL	22
FH	22	FX	140	XM	215
FJ	30	FY	190	XN	25
FK	265	FZ	380	XP	265
FL	205	XA	600	XQ	182
FM	15	XB	235	XR	255
FN	215	XC	305		
FP	100	XD	320		

SPRING SIZE DEPENDENT DIMENSIONS

	CE-16	CE-17	CE-18	CE-19
SA	472	519	538	583
SB	497	544	563	608
SC	590	635	655	700
SD	615	660	680	725
SE	615	660	680	725
SF	305	310	310	315

WEIGHTS (kgf)

	CE-16	CE-17	CE-18	CE-19
H1/H2	120	130	140	150
V1/V2	130	140	150	160
VU1/VU2	135	145	155	165
HFMT	135	145	155	165
HFMH	120	130	135	150
VFM	125	135	140	155
VFMT	145	160	165	175
VUB	130	140	150	160

SINGLE POINT SUSPENSION DIMENSION 'V'

MOVEMENT PROVIDED mm	ALL SIZES		CE-16	CE-17	CE-18	CE-19
	V1	V3				
60	64	73				
70	75	85				
80	86	96				
90	96	107				
100	105	119	110			
110	116	130	121	122	124	125
120	126	141	131	133	134	136
130	135	152	141	143	145	146
140	145	163	151	153	155	157
150	155	174	161	163	166	168
160	164	184	171	173	176	178
170	174	195	180	183	186	189
180	183	205	190	193	197	199
190	193	216	200	203	207	209
200	202	226	209	213	217	220
210	211	236	218	222	227	230
220	220	246	227	232	236	240
230	229	256	237	241	246	250
240	238	266	246	251	256	260
250			254	260	265	270
260			263	269	275	279
270			272	278	284	289
280			281	287	294	299
290			289	296	303	309
300			298	305	312	318
310			306	314	322	328
320			314	322	331	337
330			323	331	340	346
340			331	340	349	356
350			339	348	357	365
360			347	356	366	374
370			355	365	375	383
380			363	373	384	392
390			370	381	392	401
400			378	389	401	410
410			386	397	409	419
420			393	405	418	428
430			401	413	426	436
440			408	421	435	445
450			415	429	443	454
460			423	437	451	462
470			430	444	459	471
480			437	452	467	479
490			444	460	475	488
500			451	467	483	496
510			458	474	491	505
520			465	482	499	513
530			472	489	507	521
540			479	496	515	529
550			485	504	522	537
560			492	511	530	545
570			499	518	538	553
580			505	525	545	561
590			512	532	553	569
600			518	539	560	577
610			525	546	567	585
620			531	553	575	593
630			537	559	582	600
640			544	566	589	608
650			550	573	597	616
660			556	579	604	623
670			562	586	611	631
680			568	592	618	638
690			574	599	625	646
700			580	605	632	653
710			586	612	639	661
720			592	618	646	668
730			597	624	652	675
740			603	631	659	682
750			609	637	666	690

TYPES H1 AND VU1 ARE NOT USED ABOVE 240mm TRAVEL

INSTALLED HEIGHT DIMENSIONS J4 AND J7 ALLOW ± 25 mm ADJUSTMENT.

TAKE-OUT DIMENSIONS A1, A2, A3, J5, J6 AND J8 ALLOW ± 75 mm ADJUSTMENT.

WHERE SEVERE HEADROOM LIMITATIONS EXIST, DIMENSIONS A1, A2 AND A3 CAN BE REDUCED AND DIMENSIONS J5, J6 AND J8 INCREASED AS FOLLOWS BY USE OF A SHORTENED EYEBOLT:

ØX	M12	M16	M20	M24	M30	M36	M42
CHANGE mm	160	160	140	140	120	100	80

NOTE DIA. X IS THREADED ISO METRIC COARSE RIGHT HAND AS STANDARD.

NOTE THAT DIMENSIONS A1, A2, A3, J4, J5, J6, J7 AND J8 ARE GIVEN AT ZERO ROTATION, THAT IS WITH THE LEVER IN THE UPPERMOST POSITION.

N.B. DIMENSION TA IS THE MINIMUM FORWARD CLEARANCE REQUIRED.

CE: DIMENSIONS FOR SIZES CE-16 TO CE-19

MOVEMENT PROVIDED mm	ALL SIZES								CE-16				CE-17				CE-18				CE-19			
	ALL			H1 H2	V1 V2	HFMT	HFMH	VUB	ØX	VU1 VU2	VFM	VFMT	ØX	VU1 VU2	VFM	VFMT	ØX	VU1 VU2	VFM	VFMT	ØX	VU1 VU2	VFM	VFMT
	C	D	E	A1	A2	J4	J5	J8		A3	J6	J7		A3	J6	J7		A3	J6	J7		A3	J6	J7
	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm	mm		mm	mm	mm		mm	mm	mm		mm	mm	mm
	AT ZERO ROTATION								AT 0° ROTATION				AT 0° ROTATION				AT 0° ROTATION				AT 0° ROTATION			
60	80	66	46	609		625	-179	-179	M30	1081		1030	M36	1128		1075								
70	94	77	54	601		633	-171	-171	M30	1073		1038	M36	1120		1083	M36	1139		1103	M42	1184		1148
80	107	88	61	594		640	-164	-164	M30	1066		1045	M30	1113		1090	M36	1132		1110	M36	1177		1155
90	120	99	69	586		648	-156	-156	M24	1058		1053	M30	1105		1098	M30	1124		1118	M36	1169		1163
100	134	110	77	578	528	656	-148	-148	M24	1050	317	1061	M30	1097		1106	M30	1116		1126	M36	1161		1171
110	147	121	84	571	521	663	-141	-141	M24	1043	324	1068	M30	1090	369	1113	M30	1109	389	1133	M30	1154	434	1178
120	161	132	92	563	513	671	-133	-133	M24	1035	332	1076	M24	1082	377	1121	M30	1101	397	1141	M30	1146	442	1186
130	174	143	100	555	505	679	-125	-125	M20	1027	340	1084	M24	1074	385	1129	M30	1093	405	1149	M30	1138	450	1194
140	187	153	107	548	498	686	-118	-118	M20	1020	347	1091	M24	1067	392	1136	M30	1086	412	1156	M30	1131	457	1201
150	201	164	115	540	490	694	-110	-110	M20	1012	355	1099	M24	1059	400	1144	M24	1078	420	1164	M30	1123	465	1209
160	214	175	123	532	482	702	-102	-102	M20	1004	363	1107	M24	1051	408	1152	M24	1070	428	1172	M30	1115	473	1217
170	228	186	130	525	475	709	-95	-95	M20	997	370	1114	M20	1044	415	1159	M24	1063	435	1179	M30	1108	480	1224
180	241	197	138	517	467	717	-87	-87	M20	989	378	111	M20	1036	423	1156	M24	1055	443	1176	M24	1100	488	1221
190	254	208	146	509	509	714	-79	-79	M20	981	386	1119	M20	1028	431	1164	M24	1047	451	1184	M24	1092	496	1229
200	268	219	154	501	501	722	-71	-71	M20	973	394	1127	M20	1020	439	1172	M24	1039	459	1192	M24	1084	504	1237
210	281	230	161	494	494	729	-64	-64	M16	966	401	1134	M20	1013	446	1179	M20	1032	466	1199	M24	1077	511	1244
220	294	241	169	486	486	737	-56	-56	M16	958	409	1142	M20	1005	454	1187	M20	1024	474	1207	M24	1069	519	1252
230	308	252	177	478	478	745	-48	-48	M16	950	417	1150	M20	997	462	1195	M20	1016	482	1215	M24	1061	527	1260
240	321	263	184	471	471	752	-41	-41	M16	943	424	1157	M20	990	469	1202	M20	1009	489	1222	M24	1054	534	1267
250	335	274	192	508	533	785	-8	-8	M16	935	432	1165	M20	982	477	1210	M20	1001	497	1230	M24	1046	542	1275
260	348	285	200	500	525	793	0	0	M16	927	440	1173	M16	974	485	1218	M20	993	505	1238	M20	1038	550	1283
270	361	296	207	493	518	800	7	7	M16	920	447	1180	M16	967	492	1225	M20	986	512	1245	M20	1031	557	1290
280	375	307	215	485	510	808	15	15	M16	912	455	1188	M16	959	500	1233	M20	978	520	1253	M20	1023	565	1298
290	388	318	223	477	502	816	23	23	M16	904	463	1196	M16	951	508	1241	M20	970	528	1261	M20	1015	573	1306
300	401	329	230	470	495	823	30	30	M16	897	470	1203	M16	944	515	1248	M20	963	535	1268	M20	1008	580	1313
310	415	340	238	462	487	831	38	38	M16	889	478	1211	M16	936	523	1256	M20	955	543	1276	M20	1000	588	1321
320	428	351	246	454	479	839	46	46	M16	881	486	1219	M16	928	531	1264	M16	947	551	1284	M20	992	596	1329
330	442	362	253	447	472	846	53	53	M16	874	493	1226	M16	921	538	1271	M16	940	558	1291	M20	985	603	1336
340	455	373	261	489	514	845	61	61	M16	866	501	1225	M16	913	546	1270	M16	932	566	1290	M20	977	611	1335
350	468	384	269	481	506	853	69	69	M16	858	509	1233	M16	905	554	1278	M16	924	574	1298	M20	969	619	1343
360	482	395	276	474	499	860	76	76	M16	851	516	1240	M16	898	561	1285	M16	917	581	1305	M20	962	626	1350
370	495	406	284	466	491	868	84	84	M16	843	524	1248	M16	890	569	1293	M16	909	589	1313	M20	954	634	1358
380	509	417	292	458	483	876	92	92	M16	835	532	1256	M16	882	577	1301	M16	901	597	1321	M20	946	642	1366
390	522	428	299	451	476	883	99	99	M12	828	539	1263	M16	875	584	1308	M16	894	604	1328	M20	939	649	1373
400	535	439	307	443	468	891	107	107	M12	820	547	1271	M16	867	592	1316	M16	886	612	1336	M16	931	657	1381
410	549	449	315	510	535	919	135	135	M12	812	555	1279	M16	859	600	1324	M16	878	620	1344	M16	923	665	1389
420	562	460	322	503	528	926	142	142	M12	805	562	1286	M16	852	607	1331	M16	871	627	1351	M16	916	672	1396
430	575	471	330	495	520	934	150	150	M12	797	570	1294	M16	844	615	1339	M16	863	635	1359	M16	908	680	1404
440	589	482	338	487	512	942	158	158	M12	789	578	1302	M16	836	623	1347	M16	855	643	1367	M16	900	688	1412
450	602	493	345	480	505	949	165	165	M12	782	585	1309	M16	829	630	1354	M16	848	650	1374	M16	893	695	1419
460	616	504	353	472	497	957	173	173	M12	774	593	1317	M16	821	638	1362	M16	840	658	1382	M16	885	703	1427
470	629	515	361	464	489	965	181	181	M12	766	601	1325	M16	813	646	1370	M16	832	666	1390	M16	877	711	1435
480	642	526	368	457	482	972	188	188	M12	759	608	1332	M16	806	653	1377	M16	825	673	1397	M16	870	718	1442
490	656	537	376	449	474	980	196	196	M12	751	616	1340	M16	798	661	1385	M16	817	681	1405	M16	862	726	1450
500	669	548	384	441	466	988	204	204	M12	743	624	1348	M12	790	669	1393	M16	809	689	1413	M16	854	734	1458
510	683	559	391	509	509	1015	231	231	M12	736	631	1355	M12	783	676	1400	M16	802	696	1420	M16	847	741	1465
520	696	570	399	501	501	1023	239	239	M12	728	639	1363	M12	775	684	1408	M16	794	704	1428	M16	839	749	1473
530	709	581	407	493	493	1031	247	247	M12	720	647	1371	M12	767	692	1416	M16	786	712	1436	M16	831	757	1481
540	723	592	415	485	485	1039	255	255	M12	712	655	1379	M12	759	700									

CF: DIMENSIONS FOR SIZES CF-20 TO CF-23

MOVEMENT DEPENDENT DIMENSIONS								
MOVEMENT PROVIDED mm		80-130	140-210	220-300	310-410	420-500	510-600	610-750
TRAVEL RANGE DEPENDENT DIMENSIONS	U	290	290	290	290	400	400	400
	TA	276	379	496	639	756	886	1080
	TB	355	355	355	395	460	535	645
	TC	380	380	380	380	450	450	450
	TD	190	190	190	210	210	230	250
	TE	295	295	355	435	500	575	645
	TF	380	380	380	475	550	630	745
	TG	205	205	205	225	225	240	265
	TH	205	205	205	225	225	240	265
	TJ	305	305	305	305	305	305	305
TOP SUSPENSION DETAILS	CF-20	DD	46	40	33	33	33	33
		AA	90	80	70	70	70	70
		BB	75	55	55	55	55	55
		CC	130	110	100	100	100	100
		EE	15	15	12	12	12	12
		GG	60	45	40	40	40	40
	CF-21	LL	M42	M36	M30	M30	M30	M30
		DD	52	40	33	33	33	33
		AA	105	80	70	70	70	70
		BB	85	55	55	55	55	55
		CC	150	110	100	100	100	100
		EE	20	15	12	12	12	12
	CF-22	GG	70	45	40	40	40	40
		LL	M48	M36	M30	M30	M30	M30
		DD	52	46	40	33	33	33
		AA	105	90	80	70	70	70
		BB	85	75	55	55	55	55
		CC	150	130	110	100	100	100
	CF-23	EE	20	15	15	12	12	12
		GG	70	60	45	40	40	40
		LL	M48	M42	M36	M30	M30	M30
		DD	60	46	40	40	33	33
		AA	120	90	80	70	70	70
		BB	100	75	55	55	55	55
	CF-24	CC	180	130	110	110	100	100
		EE	20	15	15	15	12	12
		GG	75	60	45	45	40	40
		LL	M56	M42	M36	M36	M30	M30
		DD	60	46	40	40	33	33
		AA	120	90	80	70	70	70

FIXED DIMENSIONS			
FA	520	FQ	150
FB	177	FR	355
FC	160	FS	455
FD	111	FT	290
FE	394	FU	75
FF	15	FV	265
FG	75	FW	33
FH	33	FX	200
FJ	45	FY	260
FK	355	FZ	490
FL	265	XA	760
FM	20	XB	290
FN	280	XC	380
FP	150	XD	400
		XE	33
		XF	430
		XG	290
		XH	210
		XJ	340
		XK	590
		XL	33
		XM	280
		XN	40
		XP	345
		XQ	228
		XR	305

SPRING SIZE DEPENDENT DIMENSIONS				
	CF-20	CF-21	CF-22	CF-23
SA	662	735	782	848
SB	702	775	822	888
SC	830	900	950	1015
SD	855	925	975	1040
SE	855	925	975	1040
SF	380	385	390	395

WEIGHTS (kgf)				
	CF-20	CF-21	CF-22	CF-23
H1/H2	270	300	330	370
V1/V2	290	320	350	380
VU1/VU2	300	330	360	390
HFMT	300	330	360	390
HFMH	260	290	320	360
VFM	280	310	340	370
VFMCS	320	350	380	410
VUB	290	320	340	380

SINGLE POINT SUSPENSION DIMENSION 'V'							
MOVEMENT PROVIDED mm	ALL SIZES		CF-20		CF-21	CF-22	CF-23
	V1	V3	V2	V2	V2	V2	V2
80	83	97					
90	93	108					
100	103	120					
110	112	131					
120	122	142					
130	132	153	142	143			
140	141	164	152	153	155	156	
150	151	175	162	164	165	167	
160	160	186	172	174	176	177	
170	170	197	182	184	186	188	
180	179	208	192	194	196	198	
190	188	218	201	204	206	208	
200	197	228	211	214	216	219	
210	206	239	220	223	226	229	
220	215	249	230	233	236	239	
230	224	259	239	243	246	249	
240	233	270	248	252	256	259	
250	241	279	258	262	265	269	
260	250	289	267	271	275	279	
270	259	299	276	280	284	288	
280	267	309	285	289	294	298	
290	275	319	293	298	303	308	
300	284	328	302	307	312	317	
310			311	316	322	327	
320			319	325	331	336	
330			328	334	340	346	
340			336	343	349	355	
350			345	352	358	364	
360			353	360	367	373	
370			361	369	376	382	
380			369	377	384	392	
390			378	386	393	401	
400			386	394	402	410	
410			394	402	410	418	
420			401	410	419	427	
430			409	419	427	436	
440			417	427	436	445	
450			425	435	444	453	
460			432	443	452	462	
470			440	451	461	471	
480			447	459	469	479	
490			455	466	477	488	
500			462	474	485	496	
510			470	482	493	505	
520			477	489	501	513	
530			484	497	509	521	
540			491	505	517	529	
550			498	512	525	538	
560			505	519	532	546	
570			512	527	540	554	
580			519	534	548	562	
590			526	541	555	570	
600			533	549	563	578	
610			540	556	571	586	
620			547	563	578	593	
630			553	570	585	601	
640			560	577	593	609	
650			566	584	600	617	
660			573	591	607	624	
670			579	598	615	632	
680			586	604	622	639	
690			592	611	629	647	
700			599	618	636	655	
710			605	625	643	662	
720			611	631	650	669	
730			617	638	657	677	
740			624	644	664	684	
750			630	651	671	691	

TYPES HS AND VIS ARE NOT USED ABOVE 300mm

INSTALLED HEIGHT DIMENSIONS J4 AND J7 ALLOW ± 25 mm ADJUSTMENT.

TAKE OUT DIMENSIONS A1, A2, A3, J5, J6 AND J8 ALLOW ± 75 mm ADJUSTMENT.

WHERE SEVERE HEADROOM LIMITATIONS EXIST, DIMENSIONS A1, A2 AND A3 CAN BE REDUCED AND DIMENSIONS J5, J6 AND J8 INCREASED AS FOLLOWS BY USE OF A SHORTENED EYEBOLT:

ØX	M16	M20	M24	M30	M36	M42	M48	M56
CHANGE mm	160	140	140	120	100	80	NIL	NIL

NOTE DIA. X IS THREADED ISO METRIC COARSE RIGHT HAND AS STANDARD.

NOTE THAT DIMENSIONS A1, A2, A3, J4, J5, J6, J7 AND J8 ARE GIVEN AT ZERO ROTATION, THAT IS WITH THE LEVER IN THE UPPERMOST POSITION.

N.B. DIMENSION TA IS THE MINIMUM FORWARD CLEARANCE REQUIRED.

CF: DIMENSIONS FOR SIZES CF-20 TO CF-23

MOVEMENT PROVIDED mm	ALL SIZES				CF-20							CF-21							CF-22							CF-23																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
	ALL				HFMT	H1 H2	V1 V2	VU1 VU2	VFM	VFMT	HFHVVUB	H1 H2	V1 V2	VU1 VU2	VFM	VFMT	HFHVVUB	H1 H2	V1 V2	VU1 VU2	VFM	VFMT	HFHVVUB	H1 H2	V1 V2	VU1 VU2	VFM	VFMT	HFHVVUB																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
	C	D	E	J4																										ØX	A1	A2	A3	J6	J7	J5/J8	ØX	A1	A2	A3	J6	J7	J5/J8	ØX	A1	A2	A3	J6	J7	J5/J8	ØX	A1	A2	A3	J6	J7	J5/J8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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80	107	88	61	820	M42	669		1321		1400	-109	M48	709		1434	1470	-149																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

CG: DIMENSIONS FOR SIZES CG-24 TO CG-27

MOVEMENT DEPENDENT DIMENSIONS									
MOVEMENT PROVIDED mm									
	90-180	190-340	350-440	450-540	550-640	650-750			
TRAVEL RANGE DEPENDENT DIMENSIONS	U	355	355	385	385	525	525		
	TA	445	630	745	860	975	1102		
	TB	510	510	540	540	600	665		
	TC	475	475	475	475	600	600		
	TD	270	270	270	270	270	280		
	TE	510	510	540	600	640	695		
	TF	475	475	525	600	685	770		
	TG	290	290	290	290	290	300		
	TH	290	290	290	290	290	300		
	TJ	460	460	460	460	460	460		
TOP SUSPENSION DETAILS	CG-24	DD	60	46	40	40	40	40	
		AA	120	90	80	80	80	80	
		BB	100	75	55	55	55	55	
		CC	180	130	110	110	110	110	
		EE	20	15	15	15	15	15	
		GG	75	60	45	45	45	45	
	CG-25	LL	M56	M42	M36	M36	M36	M36	
		DD	68	52	40	40	40	40	
		AA	140	105	80	80	80	80	
		BB	115	85	55	55	55	55	
		CC	200	150	110	110	110	110	
		EE	20	20	15	15	15	15	
	CG-26	GG	80	70	45	45	45	45	
		LL	M64	M48	M36	M36	M36	M36	
		DD	68	60	46	46	40	40	
		AA	140	120	90	90	80	80	
		BB	115	100	75	75	55	55	
		CC	200	180	130	130	110	110	
	CG-27	EE	20	20	15	15	15	15	
		GG	80	75	60	60	45	45	
		LL	M64	M56	M42	M42	M36	M36	
		DD	76	60	52	46	46	46	
		AA	155	120	105	90	90	90	
		BB	130	100	85	75	75	75	
		CC	220	180	150	130	130	130	
		EE	25	20	20	15	15	15	
		GG	90	75	70	60	60	60	
		LL	M72	M56	M48	M42	M42	M42	

FIXED DIMENSIONS					
FA	655	FQ	150	XE	40
FB	228	FR	480	XF	570
FC	240	FS	585	XG	355
FD	179	FT	355	XH	320
FE	526	FU	100	XJ	440
FF	25	FV	350	XK	805
FG	100	FW	40	XL	40
FH	40	FX	280	XM	400
FJ	65	FY	375	XN	50
FK	480	FZ	630	XP	500
FL	350	XA	1020	XQ	302
FM	30	XB	355	XR	460
FN	400	XC	535		
FP	230	XD	500		

SPRING SIZE DEPENDENT DIMENSIONS				
	CS7-24	CS7-25	CS7-26	CS7-27
SA	868	868	868	868
SB	918	918	918	918
SC	1115	1115	1115	1115
SD	1150	1150	1150	1150
SE	1150	1150	1150	1150
SF	540	540	540	540

WEIGHTS (kgf)				
	CG-24	CG-25	CG-26	CG-27
H1/H2	580	620	670	720
V1/V2	610	660	710	760
VU1/VU2	630	680	730	780
HFMT	630	670	720	770
HFMH	560	610	650	710
VFM	590	640	690	740
VFMT	670	720	770	820
VUB	610	650	700	750

SINGLE POINT SUSPENSION DIMENSION 'V'						
MOVEMENT PROVIDED mm	ALL SIZES		CG-24	CG-25	CG-26	CG-27
	V1	V3				
90	91	110				
100	101	122				
110	111	133				
120	120	144				
130	130	156				
140	139	167	149			
150	149	178	158	162	165	166
160	157	189	168	172	175	177
170	167	200	178	182	185	187
180	176	211	187	192	196	198
190	185	222	197	202	206	208
200	194	232	206	212	216	218
210	203	243	216	222	226	229
220	212	254	225	232	236	239
230	220	264	234	241	246	249
240	229	275	243	251	256	259
250	238	285	252	260	266	269
260	246	295	261	270	275	279
270	255	305	270	279	285	289
280	263	315	279	288	295	299
290	272	325	287	297	304	308
300	280	335	296	307	314	318
310	288	345	304	316	323	328
320	297	355	313	325	331	337
330	305	364	321	334	342	347
340	313	374	330	342	351	356
350			338	351	360	366
360			346	360	369	375
370			354	369	378	384
380			362	377	387	394
390			370	386	396	403
400			378	394	405	412
410			386	403	414	421
420			394	411	423	430
430			401	419	431	439
440			409	428	440	448
450			416	436	449	457
460			424	444	457	466
470			431	452	466	475
480			439	460	474	483
490			446	468	483	492
500			454	476	491	501
510			461	484	499	509
520			468	492	508	518
530			475	500	516	527
540			482	507	524	535
550			489	515	532	543
560			496	523	540	552
570			503	530	548	560
580			510	538	556	569
590			517	545	564	577
600			523	553	572	585
610			530	560	580	593
620			537	567	588	601
630			543	575	596	609
640			550	582	603	617
650			556	589	611	625
660			563	596	619	633
670			569	603	626	641
680			576	610	634	649
690			582	617	641	657
700			588	624	649	665
710			594	631	656	673
720			601	638	663	680
730			607	645	671	688
740			613	652	678	696
750			619	658	685	703

TYPES HS AND VIS ARE NOT USED ABOVE 340mm TRAVEL

INSTALLED HEIGHT DIMENSIONS J4 AND J7 ALLOW ± 25 mm ADJUSTMENT.

TAKE-OUT DIMENSIONS A1, A2, A3, J5, J6 AND J8 ALLOW ± 75 mm ADJUSTMENT.

WHERE SEVERE HEADROOM LIMITATIONS EXIST, DIMENSIONS A1, A2 AND A3 CAN BE REDUCED AND DIMENSIONS J5, J6 AND J8 INCREASED AS FOLLOWS BY USE OF A SHORTENED EYEBOLT:

ØX	M20	M24	M30	M36	M42	M48	M56	M64	M72
CHANGE mm	140	140	120	100	80	NIL	NIL	NIL	NIL

NOTE DIA. X IS THREADED ISO METRIC COARSE RIGHT HAND AS STANDARD.

NOTE THAT DIMENSIONS A1, A2, A3, J4, J5, J6, J7 AND J8 ARE GIVEN AT ZERO ROTATION, THAT IS WITH THE LEVER IN THE UPPERMOST POSITION.

N.B. DIMENSION TA IS THE MINIMUM FORWARD CLEARANCE REQUIRED.

CG: DIMENSIONS FOR SIZES CG-24 TO CG-27

MOVEMENT PROVIDED mm	ALL SIZES				CG-24							CG-25							CG-26							CG-27							
	ALL				HFWT	ØX mm	H1 H2	V1 V2	VU1 VU2	VFM	VFWT	HFMHVUB	ØX mm	H1 H2	V1 V2	VU1 VU2	VFM	VFWT	HFMHVUB	ØX mm	H1 H2	V1 V2	VU1 VU2	VFM	VFWT	HFMHVUB	ØX mm	H1 H2	V1 V2	VU1 VU2	VFM	VFWT	HFMHVUB
	C mm	D mm	E mm	J4 mm			A1 mm	A2 mm	A3 mm	J6 mm	J7 mm	J5/J8 mm		A1 mm	A2 mm	A3 mm	J6 mm	J7 mm	J5/J8 mm		A1 mm	A2 mm	A3 mm	J6 mm	J7 mm	J5/J8 mm		A1 mm	A2 mm	A3 mm	J6 mm	J7 mm	J5/J8 mm
	AT 0° ROTATION						AT ZERO ROTATION							AT ZERO ROTATION							AT ZERO ROTATION												
90	120	99	69	1092	M56	871	1739		1847	-71	M64	886		1754		1847	-86																
100	134	110	77	1100	M56	863		1731		1855	-63	M64	878		1746		1855	-78															
110	147	121	84	1107	M56	856		1724		1862	-56	M64	871		1739		1862	-71	M64	871			1739	1862	-71								
120	161	132	92	1115	M48	833		1701		1870	-33	M56	848		1716		1870	-48	M64	863			1731	1870	-63	M72	913		1781		1870	-113	
130	174	143	100	1123	M48	825		1693		1878	-25	M56	840		1708		1878	-40	M64	855			1723	1878	-55	M64	855		1723		1878	-55	
140	187	153	107	1130	M48	818	818	1686	842	1885	-18	M56	833	833	1701		1885	-33	M64	848			1716	1885	-48	M64	848		1716		1885	-48	
150	201	164	115	1138	M48	810	810	1678	850	1893	-10	M56	825	825	1693	835	1893	-25	M56	825	825	1693	835	1893	-25	M64	840	840	1708	820	1893	-40	
160	214	175	123	1146	M42	762	762	1630	898	1901	38	M48	802	802	1670	858	1901	-2	M56	817	817	1685	843	1901	-17	M64	832	832	1700	828	1901	-32	
170	228	186	130	1153	M42	755	755	1623	905	1908	45	M48	795	795	1663	865	1908	5	M56	810	810	1678	850	1908	-10	M56	810	810	1678	850	1908	-10	
180	241	197	138	1161	M42	747	747	1615	913	1916	53	M48	787	787	1655	873	1916	13	M56	802	802	1670	858	1916	-2	M56	802	802	1670	858	1916	-2	
190	254	208	146	1145	M42	739	739	1607	921	1900	61	M48	779	779	1647	881	1900	21	M56	794	794	1662	866	1900	6	M56	794	794	1662	866	1900	6	
200	268	219	154	1153	M42	731	731	1599	929	1908	69	M48	771	771	1639	889	1908	29	M48	771	771	1639	889	1908	29	M56	786	786	1654	874	1908	14	
210	281	230	161	1160	M42	724	724	1592	936	1915	76	M42	724	724	1592	936	1915	76	M48	764	764	1632	896	1915	36	M56	779	779	1647	881	1915	21	
220	294	241	169	1168	M36	716	716	1584	944	1923	84	M42	716	716	1584	944	1923	84	M48	756	756	1624	904	1923	44	M56	771	771	1639	889	1923	29	
230	308	252	177	1176	M36	708	708	1576	952	1931	92	M42	708	708	1576	952	1931	92	M48	748	748	1616	912	1931	52	M56	763	763	1631	897	1931	37	
240	321	263	184	1183	M36	701	701	1569	959	1938	99	M42	701	701	1569	959	1938	99	M48	741	741	1609	919	1938	59	M48	741	741	1609	919	1938	59	
250	335	274	192	1191	M36	693	693	1561	967	1946	107	M42	693	693	1561	967	1946	107	M48	733	733	1601	927	1946	67	M48	733	733	1601	927	1946	67	
260	348	285	200	1199	M36	685	685	1553	975	1954	115	M42	685	685	1553	975	1954	115	M48	725	725	1593	935	1954	75	M48	725	725	1593	935	1954	75	
270	361	296	207	1206	M36	678	678	1546	982	1961	122	M42	678	678	1546	982	1961	122	M48	718	718	1586	942	1961	82	M48	718	718	1586	942	1961	82	
280	375	307	215	1214	M36	670	670	1538	990	1969	130	M42	670	670	1538	990	1969	130	M42	670	670	1538	990	1969	130	M48	710	710	1578	950	1969	90	
290	388	318	223	1222	M36	662	662	1530	998	1977	138	M36	662	662	1530	998	1977	138	M42	662	662	1530	998	1977	138	M48	702	702	1570	958	1977	98	
300	401	329	230	1229	M36	655	655	1523	1005	1984	145	M36	655	655	1523	1005	1984	145	M42	655	655	1523	1005	1984	145	M48	695	695	1563	965	1984	105	
310	415	340	238	1237	M30	647	647	1515	1013	1992	153	M36	647	647	1515	1013	1992	153	M42	647	647	1515	1013	1992	153	M42	647	647	1515	1013	1992	153	
320	428	351	246	1245	M30	639	639	1507	1021	2000	161	M36	639	639	1507	1021	2000	161	M42	639	639	1507	1021	2000	161	M42	639	639	1507	1021	2000	161	
330	442	362	253	1252	M30	632	632	1500	1028	2007	168	M36	632	632	1500	1028	2007	168	M42	632	632	1500	1028	2007	168	M42	632	632	1500	1028	2007	168	
340	455	373	261	1260	M30	624	624	1492	1036	2015	176	M36	624	624	1492	1036	2015	176	M42	624	624	1492	1036	2015	176	M42	624	624	1492	1036	2015	176	
350	468	384	269	1250	M30	646	646	1484	1044	2005	184	M36	646	646	1484	1044	2005	184	M42	646	646	1484	1044	2005	184	M42	646	646	1484	1044	2005	184	
360	482	395	276	1257	M30	639	639	1477	1051	2012	191	M36	639	639	1477	1051	2012	191	M36	639	639	1477	1051	2012	191	M42	639	639	1477	1051	2012	191	
370	495	406	284	1265	M30	631	631	1469	1059	2020	199	M36	631	631	1469	1059	2020	199	M36	631	631	1469	1059	2020	199	M42	631	631	1469	1059	2020	199	
380	509	417	292	1273	M30	623	623	1461	1067	2028	207	M36	623	623	1461	1067	2028	207	M36	623	623	1461	1067	2028	207	M42	623	623	1461	1067	2028	207	
390	522	428	299	1280	M30	616	616	1454	1074	2035	214	M36	616	616	1454	1074	2035	214	M36	616	616	1454	1074	2035	214	M42	616	616	1454	1074	2035	214	
400	535	439	307	1288	M30	608	608	1446	1082	2043	222	M36	608	608	1446	1082	2043	222	M36	608	608	1446	1082	2043	222	M42	608	608	1446	1082	2043	222	
410	549	449	315	1296	M30	600	600	1438	1090	2051	230	M36	600	600	1438	1090	2051	230	M36	600	600	1438	1090	2051	230	M42	600	600	1438	1090	2051	230	
420	562	460	322	1303	M30	593	593	1431	1097	2058	237	M30	593	593	1431	1097	2058	237	M36	593	593	1431	1097	2058	237	M42	593	593	1431	1097	2058	237	
430	575	471	330	1311	M30	585	585	1423	1105	2066	245	M30	585	585	1423	1105	2066	245	M36	585	585	1423	1105	2066	245	M36	585	585	1423	1105	2066	245	
440	589	482	338	1319	M30	577	577	1415	1113	2074	253	M30	577	577	1415	1113	2074	253	M36	577	577	1415	1113	2074	253	M36	577	577	1415	1113	2074	253	
450	602	493	345	1324	M30	570	570	1408	1120	2079	260	M30	570	570	1408	1120	2079	260	M36	570	570	1408	1120	2079	260	M36	570	570	1408	1120	2079	260	
460	616	504	353	1332	M30	562	562	1400	1128	2087	268	M30	562	562	1400	1128	2087	268	M36	562	562	1400	1128	2087	268	M36	562	562	1400	1128	2087	268	
470	629	515	361	1340	M30	554	554	1392	1136	2095	276	M30	554	554	1392	1136	2095	276	M36	554	554	1392	1136	2095	276	M36	554						

CG: DIMENSIONS FOR SIZES CG-28 TO CG-29

MOVEMENT DEPENDENT DIMENSIONS								
MOVEMENT PROVIDED mm		90-180	190-340	350-440	450-540	550-640	650-750	
TRAVEL RANGE DEPENDENT DIMENSIONS	U	355	355	385	385	525	525	
	TA	445	630	745	860	975	1102	
	TB	510	510	540	540	600	665	
	TC	475	475	475	475	600	600	
	TD	270	270	270	270	270	280	
	TE	510	510	570	600	655	700	
	TF	475	475	545	630	700	790	
	TG	290	290	290	290	290	300	
	TH	290	290	290	290	290	300	
TJ	460	460	460	460	460	460		
TOP SUSPENSION DETAILS	CG-28	DD	76	68	52	52	46	46
		AA	155	140	105	105	90	90
		BB	130	115	85	85	75	75
		CC	220	200	150	150	130	130
		EE	25	20	20	20	15	15
		GG	90	80	70	70	60	60
		LL	M72	M64	M48	M48	M42	M42
	CG-29	DD	85	68	60	60	52	52
		AA	175	140	120	120	105	105
		BB	150	115	100	100	85	85
		CC	240	200	180	180	150	150
		EE	25	20	20	20	20	20
		GG	100	80	75	75	70	70
		LL	M80	M64	M56	M56	M48	M48

FIXED DIMENSIONS					
FA	710	FQ	150	XE	46
FB	228	FR	480	XF	570
FC	240	FS	585	XG	355
FD	179	FT	355	XH	320
FE	572	FU	100	XJ	440
FF	25	FV	350	XK	805
FG	100	FW	46	XL	40
FH	46	FX	280	XM	415
FJ	65	FY	375	XN	60
FK	480	FZ	680	XP	500
FL	350	XA	1060	XQ	302
FM	30	XB	355	XR	460
FN	415	XC	575		
FP	230	XD	550		

SPRING SIZE DEPENDENT DIMENSIONS		
	CG-28	CG-29
SA	999	999
SB	1059	1059
SC	1245	1245
SD	1280	1280
SE	1280	1280
SF	575	575

WEIGHTS (kgf)		
	CG-28	CG-29
H1/H2	930	1000
V1/V2	970	1040
VU1/VU	990	1060
HFMT	1000	1070
HFMH	910	980
VFM	960	1030
VFMT	1050	1120
VUB	960	1030

SINGLE POINT SUSPENSION DIMENSION 'V'				
MOVEMENT PROVIDED mm	ALL SIZES		CG-28	CG-29
	V1	V3	V2	V2
120	123	145		
130	132	157		
140	142	168		
150	152	180		
160	162	191		
170	171	203		
180	181	214	196	
190	190	225	207	209
200	199	236	217	219
210	209	247	227	229
220	218	258	237	240
230	227	269	247	250
240	237	279	256	260
250	246	290	267	270
260	255	301	277	280
270	263	311	286	290
280	272	322	296	300
290	281	332	306	310
300	290	343	315	320
310	299	353	323	329
320	308	364	334	339
330	317	374	344	349
340	325	384	353	358
350			362	368
360			371	377
370			381	387
380			390	396
390			399	405
400			408	415
410			417	424
420			426	433
430			435	442
440			443	451
450			452	460
460			461	469
470			469	478
480			478	487
490			487	496
500			495	505
510			504	514
520			512	522
530			520	531
540			529	540
550			537	548
560			545	557
570			553	567
580			562	574
590			570	582
600			578	590
610			586	599
620			594	607
630			602	615
640			609	623
650			617	632
660			625	640
670			633	648
680			640	656
690			648	664
700			656	672
710			663	680
720			671	688
730			678	695
740			686	703
750			693	711

TYPES HS AND VS ARE NOT USED ABOVE 340mm TRAVEL

INSTALLED HEIGHT DIMENSIONS J4 AND J7 ALLOW ± 25 mm ADJUSTMENT.

TAKE-OUT DIMENSIONS A1, A2, A3, J5, J6 AND J8 ALLOW ± 75 mm ADJUSTMENT.

WHERE SEVERE HEADROOM LIMITATIONS EXIST, DIMENSIONS A1, A2 AND A3 CAN BE REDUCED AND DIMENSIONS J5, J6 AND J8 INCREASED AS FOLLOWS BY USE OF A SHORTENED EYEBOLT:

ØX	M36	M42	M48	M56	M64	M72	M80
CHANGE mm	100	80	NIL	NIL	NIL	NIL	NIL

NOTE DIA. X IS THREADED ISO METRIC COARSE RIGHT HAND AS STANDARD.

NOTE THAT DIMENSIONS A1, A2, A3, J4, J5, J6, J7 AND J8 ARE GIVEN AT ZERO ROTATION, THAT IS WITH THE LEVER IN THE UPPERMOST POSITION.

N.B. DIMENSION TA IS THE MINIMUM FORWARD CLEARANCE REQUIRED.

CG: DIMENSIONS FOR SIZES CG-28 AND CG-29

MOVEMENT PROVUZED mm	ALL SIZES				CG-28								CG-29									
	ALL				HFMT	ØX mm	H1 H2	V1 V2	VU1 VU2	HFMH	VUB	VFMT	VFM	ØX mm	H1 H2	V1 V2	VU1 VU2	HFMH	VUB	VFMT	VFM	
	C mm	D mm	E mm	J4 mm			A1 mm	A2 mm	A3 mm	J5 mm	J6 mm	J7 mm	J8 mm		A1 mm	A2 mm	A3 mm	J5 mm	J6 mm	J7 mm	J8 mm	
	AT ZERO ROTATION						AT ZERO ROTATION								AT ZERO ROTATION							
	120	161	132	92	1131	M72	913		1922	-113			2016	-113					1994	-185		2024
130	174	143	100	1139	M72	905		1914	-105			2024	-105	M80	985			1994	-185		2024	-185
140	187	153	107	1146	M72	898		1907	-98			2031	-98	M80	978		1987	-178		2031	-178	
150	201	164	115	1154	M72	890		1899	-90			2039	-90	M72	890		1899	-90		2039	-90	
160	214	175	123	1162	M64	832		1841	-32			2047	-32	M72	882		1891	-82		2047	-82	
170	228	186	130	1169	M64	825		1834	-25			2054	-25	M72	875		1884	-75		2054	-75	
180	241	197	138	1177	M64	817	817	1826	-17	973	2062	-17	M72	867		1876	-67		2062	-67		
190	254	208	146	1171	M64	809	809	1818	-9	981	2056	-9	M64	809	809	1818	-9	981	2056	-9		
200	268	219	154	1179	M64	801	801	1810	-1	989	2064	-1	M64	801	801	1810	-1	989	2064	-1		
210	281	230	161	1186	M56	779	779	1788	21	1011	2071	21	M64	794	794	1803	6	996	2071	6		
220	294	241	169	1194	M56	771	771	1780	29	1019	2079	29	M64	786	786	1795	14	1004	2079	14		
230	308	252	177	1202	M56	763	763	1772	37	1027	2087	37	M64	778	778	1787	22	1012	2087	22		
240	321	263	184	1209	M56	756	756	1765	44	1034	2094	44	M64	771	771	1780	29	1019	2094	29		
250	335	274	192	1217	M56	748	748	1757	52	1042	2102	52	M56	748	748	1757	52	1042	2102	52		
260	348	285	200	1225	M56	740	740	1749	60	1050	2110	60	M56	740	740	1749	60	1050	2110	60		
270	361	296	207	1232	M56	733	733	1742	67	1057	2117	67	M56	733	733	1742	67	1057	2117	67		
280	375	307	215	1240	M56	725	725	1734	75	1065	2125	75	M56	725	725	1734	75	1065	2125	75		
290	388	318	223	1248	M48	702	702	1711	98	1088	2133	98	M56	717	717	1726	83	1073	2133	83		
300	401	329	230	1255	M48	695	695	1704	105	1095	2140	105	M56	710	710	1719	90	1080	2140	90		
310	415	340	238	1263	M48	687	687	1696	113	1103	2148	113	M56	702	702	1711	98	1088	2148	98		
320	428	351	246	1271	M48	679	679	1688	121	1111	2156	121	M56	694	694	1703	106	1096	2156	106		
330	442	362	253	1278	M48	672	672	1681	128	1118	2163	128	M56	687	687	1696	113	1103	2163	113		
340	455	373	261	1286	M48	664	664	1673	136	1126	2171	136	M56	679	679	1688	121	1111	2171	121		
350	468	384	269	1270	M48	686	716	1665	144	1134	2155	144	M48	686	716	1665	144	1134	2155	144		
360	482	395	276	1277	M48	679	709	1658	151	1141	2162	151	M48	679	709	1658	151	1141	2162	151		
370	495	406	284	1285	M48	671	701	1650	159	1149	2170	159	M48	671	701	1650	159	1149	2170	159		
380	509	417	292	1293	M42	623	653	1602	207	1197	2178	207	M48	663	693	1642	167	1157	2178	167		
390	522	428	299	1300	M42	616	646	1595	214	1204	2185	214	M48	656	686	1635	174	1164	2185	174		
400	535	439	307	1308	M42	608	638	1587	222	1212	2193	222	M48	648	678	1627	182	1172	2193	182		
410	549	449	315	1316	M42	600	630	1579	230	1220	2201	230	M48	640	670	1619	190	1180	2201	190		
420	562	460	322	1323	M42	593	623	1572	237	1227	2208	237	M48	633	663	1612	197	1187	2208	197		
430	575	471	330	1331	M42	585	615	1564	245	1235	2216	245	M48	625	655	1604	205	1195	2216	205		
440	589	482	338	1339	M42	577	607	1556	253	1243	2224	253	M48	617	647	1596	213	1203	2224	213		
450	602	493	345	1331	M42	570	630	1549	260	1250	2216	260	M42	570	630	1549	260	1250	2216	260		
460	616	504	353	1339	M42	562	622	1541	268	1258	2224	268	M42	562	622	1541	268	1258	2224	268		
470	629	515	361	1347	M42	554	614	1533	276	1266	2232	276	M42	554	614	1533	276	1266	2232	276		
480	642	526	368	1354	M42	547	607	1526	283	1273	2239	283	M42	547	607	1526	283	1273	2239	283		
490	656	537	376	1362	M42	539	599	1518	291	1281	2247	291	M42	539	599	1518	291	1281	2247	291		
500	669	548	384	1370	M42	531	591	1510	299	1289	2255	299	M42	531	591	1510	299	1289	2255	299		
510	683	559	391	1377	M42	524	584	1503	306	1296	2262	306	M42	524	584	1503	306	1296	2262	306		
520	696	570	399	1385	M36	516	576	1495	314	1304	2270	314	M42	516	576	1495	314	1304	2270	314		
530	709	581	407	1393	M36	508	568	1487	322	1312	2278	322	M42	508	568	1487	322	1312	2278	322		
540	723	592	415	1401	M36	500	560	1479	330	1320	2286	330	M42	500	560	1479	330	1320	2286	330		
550	736	603	422	1400	M36	553	608	1472	337	1327	2285	337	M42	553	608	1472	337	1327	2285	337		
560	749	614	430	1408	M36	545	600	1464	345	1335	2293	345	M42	545	600	1464	345	1335	2293	345		
570	763	625	438	1416	M36	537	592	1456	353	1343	2301	353	M42	537	592	1456	353	1343	2301	353		
580	776	636	445	1423	M36	530	585	1449	360	1350	2308	360	M42	530	585	1449	360	1350	2308	360		
590	790	647	453	1431	M36	522	577	1441	368	1358	2316	368	M42	522	577	1441	368	1358	2316	368		
600	803	658	461	1439	M36	514	569	1433	376	1366	2324	376	M42	514	569	1433	376	1366	2324	376		
610	816	669	468	1446	M36	507	562	1426	383	1373	2331	383	M42	507	562	1426	383	1373	2331	383		
620	830	680	476	1454	M36	499	554	1418	391	1381	2339	391	M36	499	554	1418	391	1381	2339	391		
630	843	691	484	1462	M36	491	546	1410	399	1389	2347	399	M36	491	546	1410	399	1389	2347	399		
640	857	702	491	1469	M36	484	539	1403	406	1396	2354	406	M36	484	539	1403	406	1396	2354	406		
650	870	713	499	1487	M36	541	576	1395	424	1404	2362	424	M36	541	576	1395	424	1404	2362	424		
660	883	724	507	1495	M36	533	568	1387	432	1412	2370	432	M36	533	568	1387	432	1412	2370	432		
670	897	734	514	1502	M36	526	561	1380	439	1419	2377	439	M36	526	561	1380	439	1419	2377	439		
680	910	745	522	1510	M36	518	553	1372	447	1427	2385	447	M36	518	553	1372	447	1427	2385	447		
690	923	756	530	1518	M36	510	545	1364	455	1435	2393	455	M36	510	545	1364	455	1435	2393	455		
700	937	767	537	1525	M36	503	538	1357	462	1442	2400	462	M36	503	538	1357	462	1442	2400	462		
710	950	778	545	1533	M36	495	530	1349	470	1450	2408	470	M36	495	530	1349	470	1450	2408	470		
720	964	789	553																			

CH: DIMENSIONS FOR SIZE CH-30

MOVEMENT DEPENDENT DIMENSIONS							
MOVEMENT PROVIDED mm		150-190	200-340	350-440	450-540	550-640	650-750
TRAVEL RANGE DEPENDENT DIMENSIONS	U	300	400	400	500	500	600
	TA	470	600	720	850	970	1110
	TB	650	650	650	650	650	705
	TC	440	520	520	615	615	690
	TE	—	650	650	650	675	705
	TF	—	540	540	620	700	775
	TG	320	320	320	320	320	320
TOP SUSPENSION DETAILS	DD	95	76	68	60	60	52
	AA	200	155	140	120	120	105
	BB	170	130	115	100	100	85
	CC	260	220	200	180	180	150
	EE	30	25	20	20	20	20
	GG	120	90	80	75	75	70

FIXED DIMENSIONS			
FA	812	FR	565
FB	332	FS	660
FC	330	FT	400
FD	179	FU	150
FE	657	FV	455
FF	25	FW	40
FG	150	SA	1200
FP	280	SC	1540

WEIGHTS (kgf)	
	CH-30
H1/H2	1570
V1/V2	1660
HFMH	1540

CH-30 SUPPORTS ARE AVAILABLE IN THE FOLLOWING TYPES

TYPE HFMH

TYPE H1, STYLE S2 AND S3

TYPE H2, STYLE S2, S3 AND S4

TYPE V1, STYLE S2 AND S3

TYPE V2, STYLE S2, S3 AND S4

TAKE-OUT DIMENSIONS A1, A2 AND J5 ALLOW ± 75 mm ADJUSTMENT

NOTE DIA. X IS THREADED ISO METRIC COARSE RIGHT HAND AS STANDARD.

NOTE THAT DIMENSIONS A1, A2 AND J5 ARE GIVEN AT ZERO ROTATION, THAT IS WITH THE LEVER IN THE UPPERMOST POSITION.

MOVEMENT PROVIDED mm	ØX mm	ALL			H1 H2	H1	V1 V2	V1	HFMH
		C mm	D mm	E mm	A1 mm	V1 mm	A2 mm	V2 mm	J5 mm
		AT ZERO ROTATION							
150	M90	201	164	115	1210	141			-240
160	M80	214	175	123	1102	150			-132
170	M80	228	186	130	1095	159			-125
180	M80	241	197	138	1087	168			-117
190	M80	254	208	146	1079	177			-109
200	M72	268	219	154	991	186	991	215	-21
210	M72	281	230	161	984	194	984	224	-14
220	M72	294	241	169	976	203	976	234	-6
230	M72	308	252	177	968	211	968	244	2
240	M72	321	263	184	961	220	961	254	9
250	M72	335	274	192	953	228	953	264	17
260	M64	348	285	200	895	237	895	273	75
270	M64	361	296	207	888	245	888	283	82
280	M64	375	307	215	880	253	880	293	90
290	M64	388	318	223	872	261	872	302	98
300	M64	401	329	230	865	270	865	312	105
310	M64	415	340	238	857	278	857	321	113
320	M64	428	351	246	849	286	849	330	121
330	M64	442	362	253	842	294	842	339	128
340	M56	455	373	261	819	302	819	349	151
350	M56	468	384	269	811	310	811	358	159
360	M56	482	395	276	804	318	804	367	166
370	M56	495	406	284	796	325	796	376	174
380	M56	509	417	292	788	333	788	385	182
390	M56	522	428	299	781	341	781	394	189
400	M56	535	439	307	773	348	773	403	197
410	M56	549	449	315	765	356	765	411	205
420	M56	562	460	322	758	364	758	420	212
430	M56	575	471	330	750	371	750	429	220
440	M56	589	482	338	742	379	742	437	228
450	M56	602	493	345	735	386	735	446	235
460	M56	616	504	353	727	394	727	455	243
470	M48	629	515	361	704	401	704	463	266
480	M48	642	526	368	697	408	697	471	273
490	M48	656	537	376	689	415	689	480	281
500	M48	669	548	384	681	423	681	488	289
510	M48	683	559	391	674	430	674	496	296
520	M48	696	570	399	666	437	666	505	304
530	M48	709	581	407	658	444	658	513	312
540	M48	723	592	415	650	451	650	521	320
550	M48	736	603	422	643	458	643	529	327
560	M48	749	614	430	635	465	635	537	335
570	M48	763	625	438	627	472	627	545	343
580	M48	776	636	445	620	479	620	553	350
590	M48	790	647	453	612	486	612	561	358
600	M48	803	658	461	604	493	604	569	366
610	M42	816	669	468	597	499	597	577	413
620	M42	830	680	476	549	506	549	584	421
630	M42	843	691	484	541	513	541	592	429
640	M42	857	702	491	534	520	534	600	436
650	M42	870	713	499	526	526	526	608	444
660	M42	883	724	507	518	533	518	615	452
670	M42	897	734	514	510	539	510	623	459
680	M42	910	745	522	502	546	502	630	467
690	M42	923	756	530	494	552	494	638	475
700	M42	937	767	537	486	559	486	645	482
710	M42	950	778	545	478	565	478	653	490
720	M42	964	789	553	470	571	470	660	498
730	M42	977	800	560	462	578	462	667	505
740	M42	990	811	568	454	584	454	674	513
750	M42	1004	822	576	446	590	446	682	521

CH: DIMENSIONS FOR SIZE CH-31

MOVEMENT DEPENDENT DIMENSIONS							
MOVEMENT PROVIDED mm		160-190	200-340	350-440	450-540	550-640	650-750
TRAVEL RANGE DEPENDENT DIMENSIONS	U	300	400	400	500	500	600
	TA	470	600	720	850	970	1110
	TB	650	650	650	650	650	705
	TC	440	520	520	615	615	690
	TE	—	650	650	650	675	705
	TF	—	540	540	620	700	775
	TG	320	320	320	320	320	320
	DD	95	85	68	68	68	60
TOP SUSPENSION DETAILS	AA	200	175	140	140	140	120
	BB	170	150	115	115	115	100
	CC	260	240	200	200	200	180
	EE	30	25	20	20	20	20
	GG	120	100	80	80	80	75

FIXED DIMENSIONS			
FA	876	FR	565
FB	332	FS	660
FC	330	FT	400
FD	179	FU	150
FE	733	FV	455
FF	25	FW	40
FG	150	SA	1250
FP	280	SC	1590

WEIGHTS (kgf)	
	CH-31
H1/H2	1950
V1/V2	2040
HFMH	1920

CH-31 SUPPORTS ARE AVAILABLE IN THE FOLLOWING TYPES

TYPE HFMH

TYPE H1, STYLE S2 AND S3

TYPE H2, STYLE S2, S3 AND S4

TYPE V1, STYLE S2 AND S3

TYPE V2, STYLE S2, S3 AND S4

TAKE-OUT DIMENSIONS A1, A2 AND J5 ALLOW ± 75 mm ADJUSTMENT

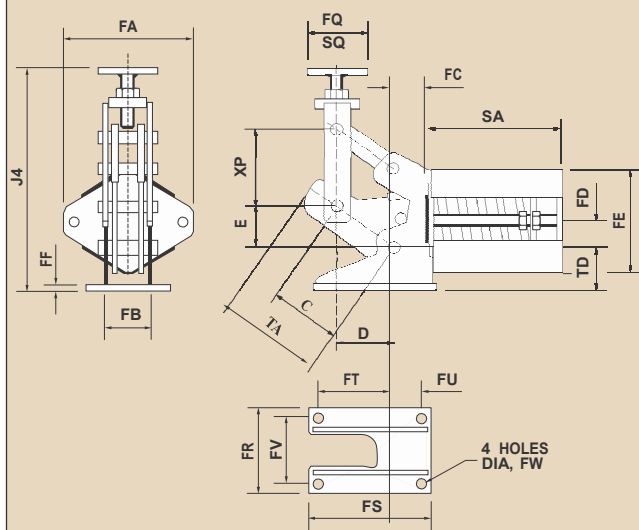
NOTE DIA. X IS THREADED ISO METRIC COARSE RIGHT HAND AS STANDARD.

NOTE THAT DIMENSIONS A1, A2 AND J5 ARE GIVEN AT ZERO ROTATION, THAT IS WITH THE LEVER IN THE UPPERMOST POSITION.

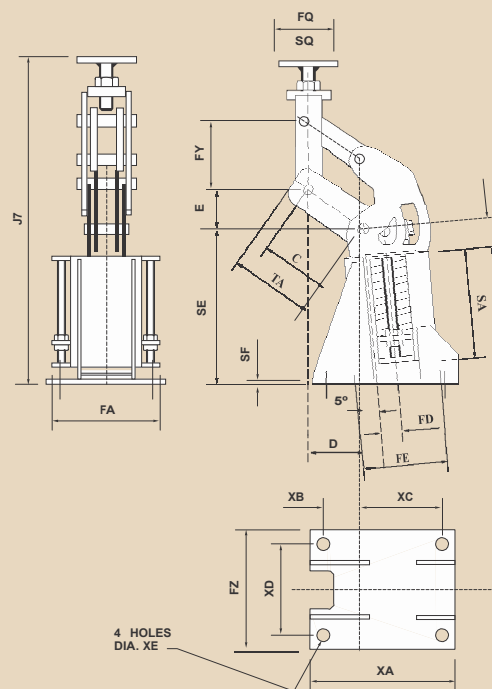
MOVEMENT PROVIDED mm	ØX mm	ALL			H1 H2	H1	V1 V2	V1	HFMH
		C mm	D mm	E mm	A1 mm	V1 mm	A2 mm	V2 mm	J5 mm
		AT ZERO ROTATION							
160	M90	214	175	123	1202	148			-232
170	M90	228	186	130	1195	157			-225
180	M90	241	197	138	1187	166			-217
190	M90	254	208	146	1179	174			-209
200	M80	268	219	154	1071	183			-101
210	M80	281	230	161	1064	191			-94
220	M80	294	241	169	1056	200			-86
230	M80	308	252	177	1048	208			-78
240	M80	321	263	184	1041	216	1041	254	-71
250	M72	335	274	192	953	225	953	263	17
260	M72	348	285	200	945	233	945	273	25
270	M72	361	296	207	938	241	938	283	32
280	M72	375	307	215	930	249	930	292	40
290	M72	388	318	223	922	257	922	302	48
300	M72	401	329	230	915	266	915	311	55
310	M72	415	340	238	907	274	907	320	63
320	M64	428	351	246	849	281	849	330	121
330	M64	442	362	253	842	289	842	339	128
340	M64	455	373	261	834	297	834	348	136
350	M64	468	384	269	826	305	826	357	144
360	M64	482	395	276	819	313	819	366	151
370	M64	495	406	284	811	320	811	375	159
380	M64	509	417	292	803	328	803	384	167
390	M64	522	428	299	796	336	796	393	174
400	M64	535	439	307	788	343	788	402	182
410	M64	549	449	315	780	351	780	411	190
420	M64	562	460	322	773	358	773	419	197
430	M56	575	471	330	750	366	750	428	220
440	M56	589	482	338	742	373	742	437	228
450	M56	602	493	345	735	380	735	445	235
460	M56	616	504	353	727	388	727	454	243
470	M56	629	515	361	719	395	719	462	251
480	M56	642	526	368	712	402	712	471	258
490	M56	656	537	376	704	409	704	479	266
500	M56	669	548	384	696	416	696	488	274
510	M56	683	559	391	689	424	689	496	281
520	M56	696	570	399	681	431	681	504	289
530	M56	709	581	407	673	438	673	512	297
540	M56	723	592	415	665	445	665	520	305
550	M56	736	603	422	658	451	658	529	312
560	M56	749	614	430	650	458	650	537	320
570	M56	763	625	438	642	465	642	545	328
580	M56	776	636	445	635	472	635	553	335
590	M48	790	647	453	612	479	612	560	358
600	M48	803	658	461	604	485	604	568	366
610	M48	816	669	468	597	492	597	576	373
620	M48	830	680	476	589	499	589	584	381
630	M48	843	691	484	581	505	581	592	389
640	M48	857	702	491	574	512	574	599	396
650	M48	870	713	499	566	519	566	607	404
660	M48	883	724	507	558	525	558	615	412
670	M48	897	734	514	550	531	550	622	419
680	M48	910	745	522	542	538	542	630	427
690	M48	923	756	530	534	544	534	637	435
700	M48	937	767	537	526	551	526	645	442
710	M48	950	778	545	518	557	518	652	450
720	M48	964	789	553	510	563	510	659	458
730	M48	977	800	560	502	569	502	667	465
740	M48	990	811	568	494	576	494	674	473
750	M48	1004	822	576	486	582	486	681	481

CONSTANT EFFORT SUPPORTS: BASE MOUNTED TYPES

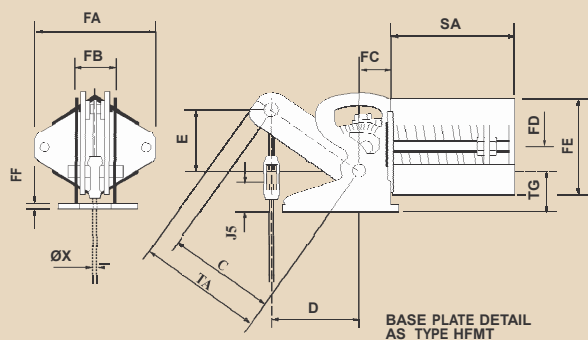
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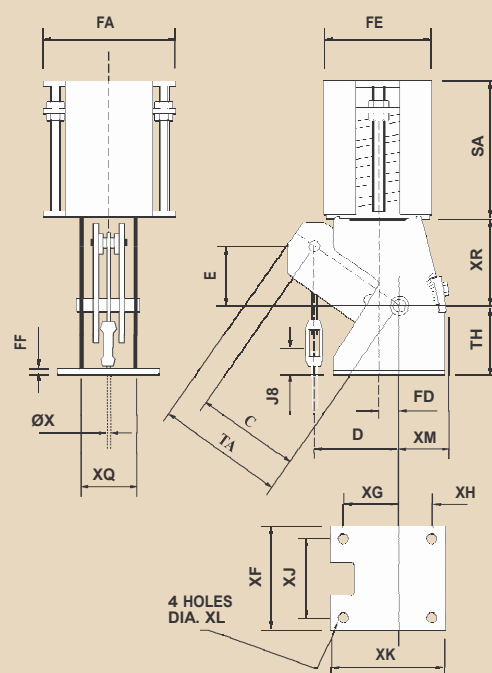
TYPE VFMT



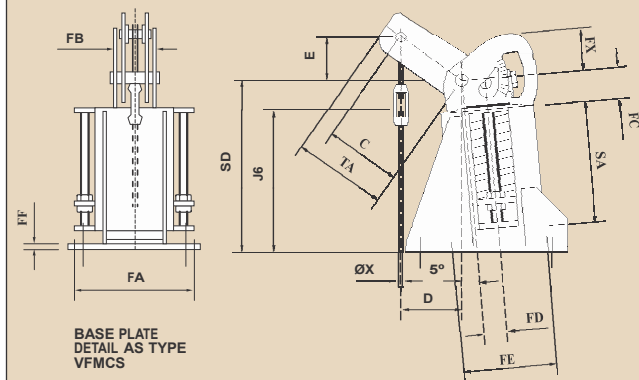
TYPE HFMH



TYPE VUB



TYPE VFM

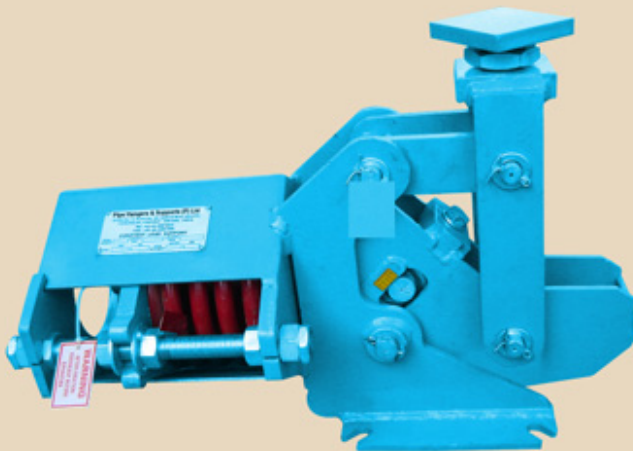
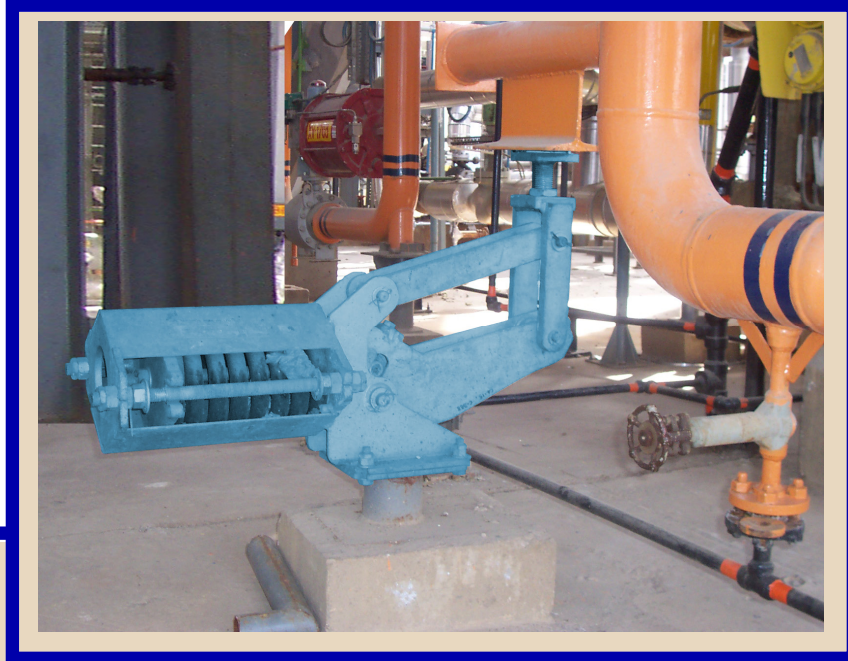




**TURN OUT THIS PAGE FOR DETAILS OF SUPPORT SIZE CH-31
AND FOR DIAGRAMS OF CONSTANT EFFORT SUPPORTS: BASE
MOUNTED TYPES**

CONSTANT EFFORT SUPPORTS

Constant Effort Support
Type HFMT
Onsite.



Constant Effort Support —
Type HFMT