NORDIC FASTENING GROUP AB

TENSION ROD SYSTEM - OVERVIEW

- NFG-DS 640
- NFG-DS 500

CE

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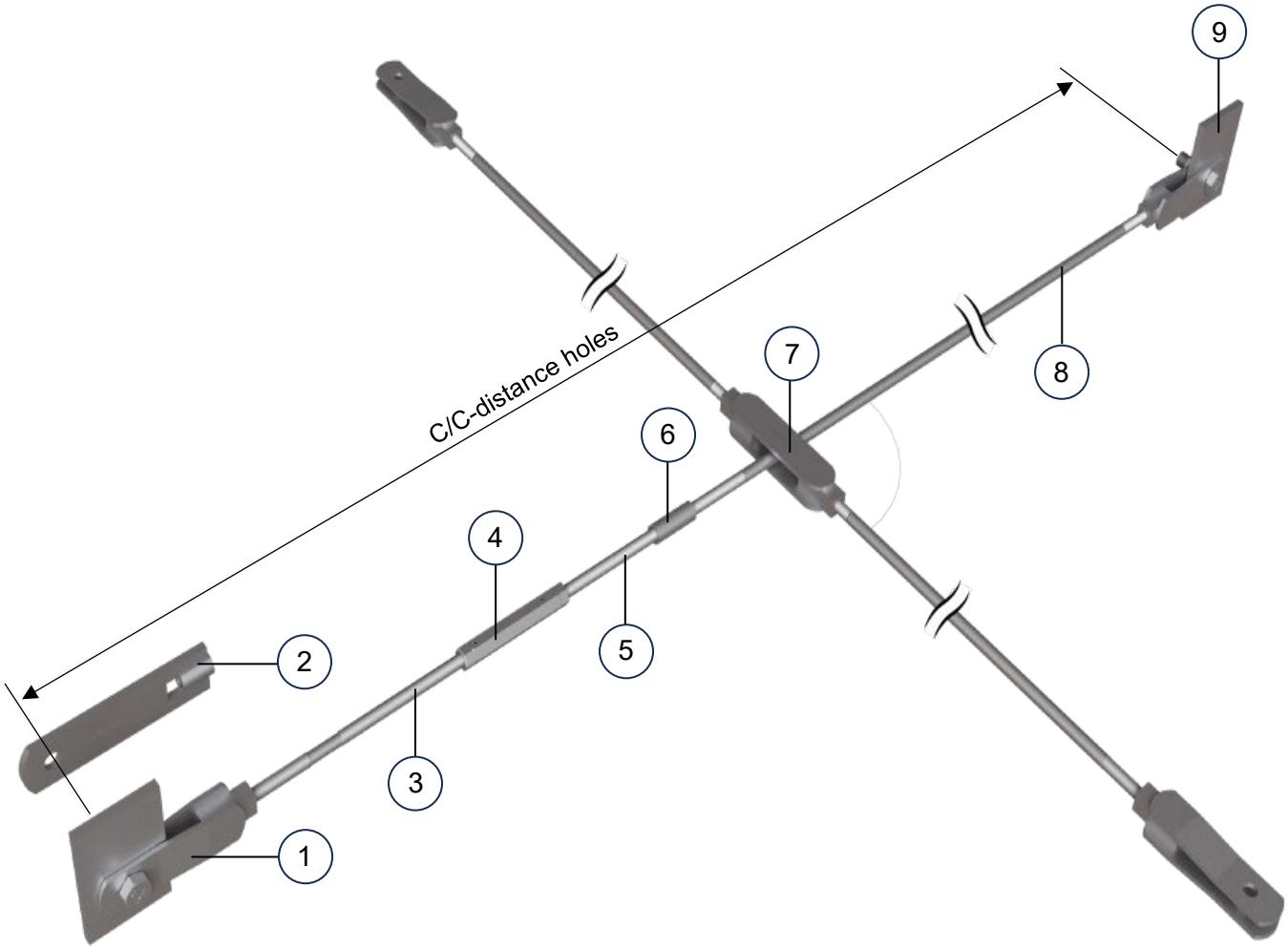
Component Overview

When ordering components for a system, specify the centre distance between the holes on the forks. For tension rod systems without fork (with only rod, joints, and nut), the total length should be specified.

No	Product Group	Designation
1	2312	Double-sided fork
2	2323	Single-sided fork
3	2310	Adjustment rod
4	2311	Turnbuckle
5	1302	Threaded rod
6	2314	Connection sleeve
7	2324	Cross sleeve
8	2313	Tension rod
9	2319	Connection plate 90 degrees
9	2320	Connection plate straight

CE

296 / CPR / 695



Corrosion Protection

Sheet metal components are hot-dip galvanized according to SS EN 1461:2009, and threaded parts are hot-dip galvanized according to EN 10684:2004. Min. 40 µm on threaded parts.
The system can be used in a C4 environment. Depending on the lifespan requirement, additional surface treatment might be necessary.

CE Marking

The NFG Tension Rod System is CE marked according to EN 1090-1:2009+A1:2011.
All production batches are verified in our own laboratory to guarantee the mechanical properties listed in the Declaration of Performance.
Tension rod systems are produced in execution class 2 (EXC2) but can also be ordered in execution class 3 (EXC3).
The products are delivered with a Declaration of Performance and a Certificate.

Tension system

Table 1 Material properties

Product Name	Material	Yield strength [MPa]	Ultimate tensile strength [MPa]	Impact strength [J at -20°C]	Min. Elongation [%]
NFG DS 640	Carbon steel	640	800	27	12
NFG DS 500[1])	Carbon steel	500	620	27	12

[1]) Refers to double-sided fork M24 (23122402300205L) and M30 (23123002650205L) with a smaller locking bolt.

Table 2 Design values

Dimension [mm]	Nom. Diameter [mm]	Yield strength $N_{Rk,y}$ [kN]	Ultimate tensile strength $N_{Rk,u}$ [kN]	Design load, Fork [1] N_{Rd} [kN]	
				Double-sided	Single-sided
M12	12	54	67,4	-	51
M16	16	100	125	94	89
M20	20	157	203	147	147
M24	24	226	293	208 / 198[2])	212
M30	30	359	466	321 / 263[2])	-

[1]) When combining different connection forks, the minimum design capacity (N_{Rd}) shall be used.

[2]) Capacity refers to double-sided fork M24 (23122402300205L) and M30 (23123002650205L) with a smaller locking bolt.

Table 3 Recommended locking bolts

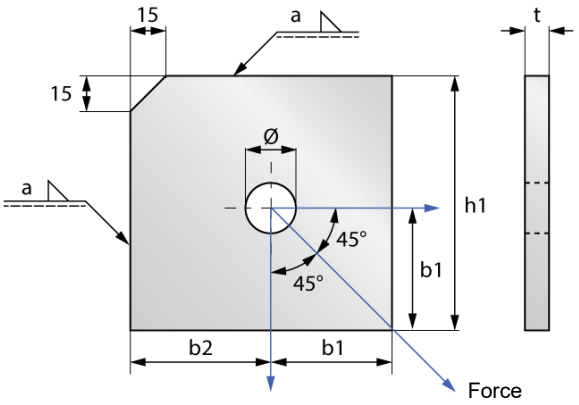
Fork	Double-sided fork VG 2312	Single-sided fork VG 2323
	EN 14399-4 10.9 HDG Incl. nut EN 14399-4	EN 15048-1 8.8 U HDG
M12	-	M16
M16	M16x55	M20
M20	M20x65	M24
M24	M24x75 / M20x65[1])	M30
M30	M30x85 / M27x80[1])	-

[1]) Refers to smaller dimension of locking bolt for double-sided fork M24 (23122402300205L) and M30 (23123002650205L).

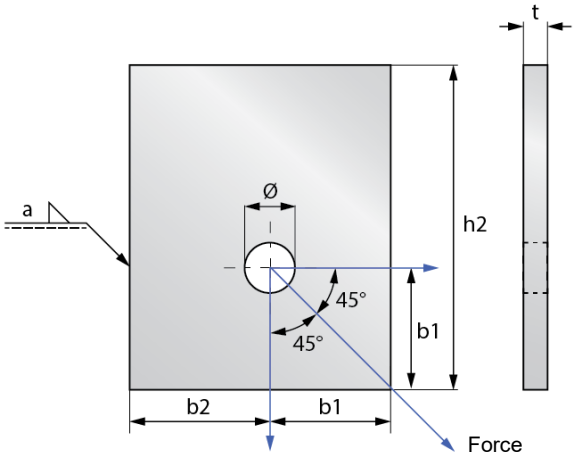
Connection plates for Double-sided fork VG 2319 & 2320

Material: S355J2
Welds are designed for static loads.
The weld is only designed for loads in the same plane as the connection plate.
a = weld size.

Connection plate 90 degrees – VG 2319



Connection plate straight – VG 2320



Connection plate	Article	Bolt size	*t* [mm]	b_1 [mm]	b_2 [mm]	Ø [mm]	H_1 [mm]	H_2 [mm]	*a* [mm]
90 degrees	23191600000005	M16	12	50	60	18	110	110	5
Straight	23201600000005								
90 degrees	23192000000005	M20	12	50	60	22	110	150	5
Straight	23202000000005								
90 degrees	231924000000051)	M24	12	60	70	22 1)	130	170	6
	23192400000005L24					26			
Straight	232024000000051)					22 1)			
	23202400000005L24					26			
90 degrees	231930000000051)	M30	15	75	80	29 1)	155	255	6
	23193000000005L30					32			
Straight	232030000000051)					29 1)			
	23203000000005L30					32			

1) Adapted for a double-sided fork with smaller locking bolt M24 and M30

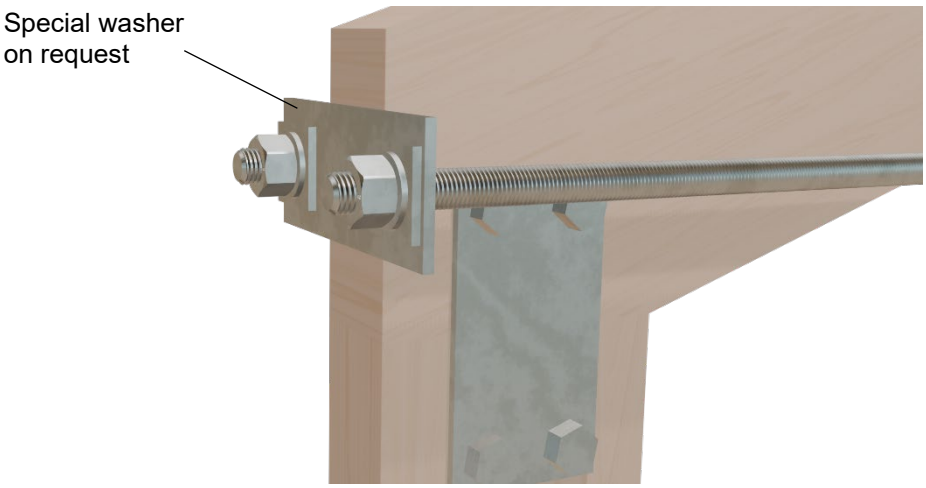
Connection plate assembly

Connection plate 90 degrees – VG 2319

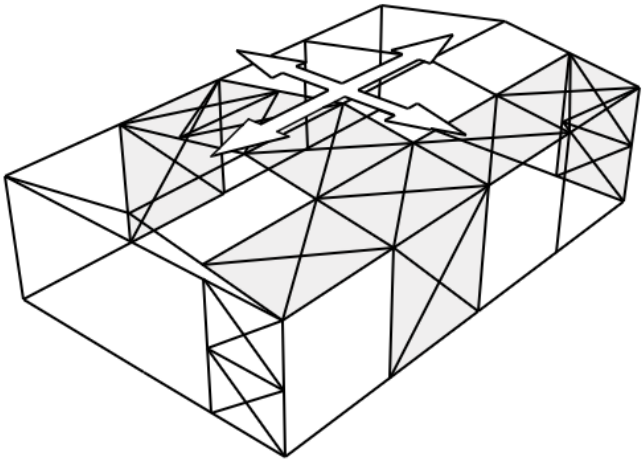
Connection plate Straight – VG 2320

Alternative bracing solutions

Glulam Tension Rod System



WIND CROSS STABILIZATION



BALCONY INSTALLATION