Tensioning **hydraulics**

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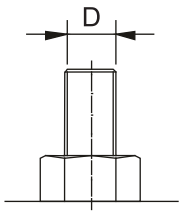
6-step plan for selection of stud tension cylinders

Step 1
cylinder selection by bolt diameter

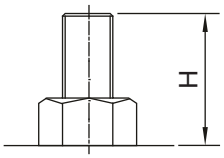
Step 2
check height of threaded rod

Step 3
check stud tension force

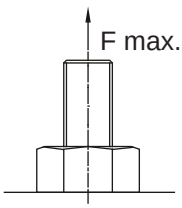
Step 4
check cylinder dimensions



stud tension cylinder	bolt diameter - through to	
	mm	inch
HHX 14	M20 - M22	3/4 - 7/8
HHX 22	M24 - M28	1 - 1 1/8
HHX 35	M30 - M34	1 1/4 - 1 3/8
HTX 50	M36 - M40	1 1/2 - 1 5/8
HTX 70	M42 - M46	1 3/4 - 1 7/8
HTX 100	M48 - M56	2 - 2 1/4
HTX 150	M60 - M68	2 1/2 - 2 3/4
HTX 180	M72 - M76	2 3/4 - 3
HTX 220	M76 - M80	3 - 3 1/4
HTX 260	M80 - M85	3 1/4 - 3 1/2



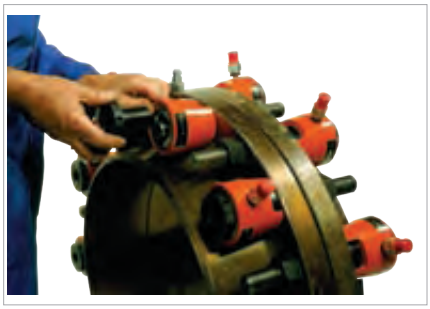
minimum height of threaded rod above flange
mm
28 + D
30 + D
35 + D
55 + D
65 + D
70 + D
90 + D
90 + D
85 + D
105 + D



max. pulling force	
ton	kN
14	140
22	221
35	352
50	501
70	702
100	999
150	1500
180	1803
220	2174
260	2601

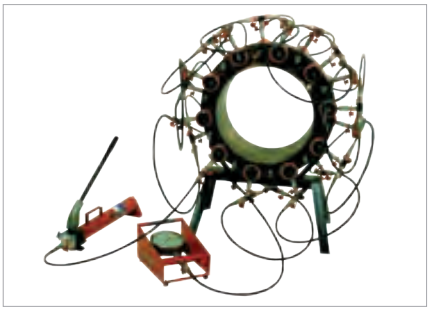
see table stud tension cylinders, pages 124 and 125

Stud tension cylinder system



Placing cylinder and pulling nut over nut socket and bolt.

The tommy bar makes the nut socket (and therefore the nut) turn very easily.

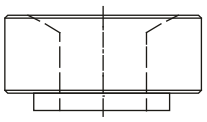


A complete set-up in which a cylinder has been placed on every bolt (so-called 100% occupation).

6-step plan for selection of stud tension cylinders

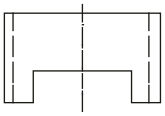
Step 5

assembly of a stud tension cylinder



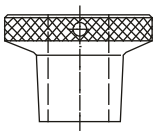
stud tension cylinder

model	art no
HHX 14	110.011.101
HHX 22	110.011.002
HHX 35	110.011.012
HTX 50	110.011.121
HTX 70	110.011.131
HTX 100	110.011.141
HTX 150	110.011.151
HTX 180	110.011.161
HTX 220	110.011.171
HTX 260	110.011.181



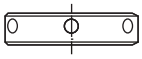
cylinder bridge

model	art no
-	-
-	-
-	-
BR 50	110.181.151
BR 70	110.181.152
BR 100	110.181.153
BR 150	110.181.154
BR 180	110.181.155
BR 220	110.181.156
BR 260	110.181.157



pulling nut*

model
PN 14 + DRAAD
PN 22 + DRAAD
PN 35 + DRAAD
PN 50 + DRAAD
PN 70 + DRAAD
PN 100 + DRAAD
PN 150 + DRAAD
PN 180 + DRAAD
PN 220 + DRAAD
PN 260 + DRAAD



nut socket**

model
NS 14 + SLW
NS 22 + SLW
NS 35 + SLW
NS 50 + SLW
NS 70 + SLW
NS 100 + SLW
NS 150 + SLW
NS 180 + SLW
NS 220 + SLW
NS 260 + SLW

tommy bar

art no	ø mm
110.181.090	6
110.181.091	8
110.181.091	8
110.181.091	8
110.181.092	10
110.181.092	10
110.181.093	12
110.181.093	12
110.181.093	12
110.181.094	16

* THREAD = thread type x pitch (e.g. M36 x 4)
** SLW = key size of nut (e.g. SLW 50)

Step 6

additional items for connection or operation, based on the n-number of cylinders that will be used in a coupled situation

no	description	mention with order
n	connection pieces	connection pieces A 240 U, art no 110.582.240
n-1	hoses between the cylinders	e.g. hose, model X 1.2 MU, art no 110.572.012 (for further specifications see section 'Pumps and hoses', page 127).
2	hoses to pump and pressure gauge	e.g. hose, model X 3 MU, art no 110.572.030 (for further specifications see section 'Pumps and hoses', page 127).
1	pump (hand or foot operated)	e.g. hand pump, model HTWX 1800 BU, art no 110.142.003 (for further specifications see section 'Pumps and hoses', page 127).
1	pressure gauge	pressure gauge A 148 U, art no 110.582.348 (for further specifications see section 'Couplers and accessories', page 128)

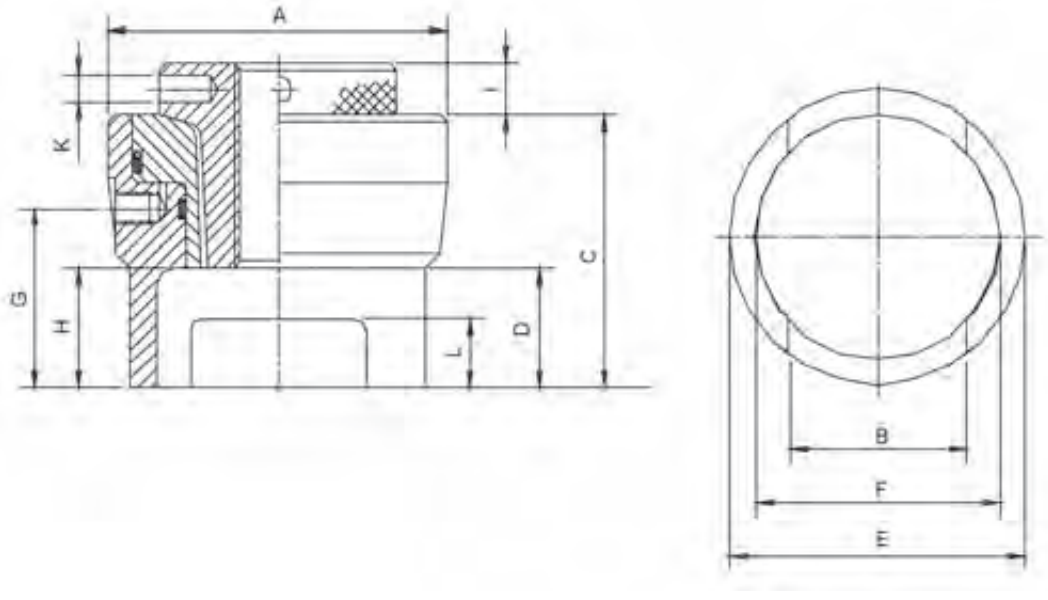
Recommendation with respect to the number of cylinders to be used: the best result is achieved with a 100% occupation. This implies that every threaded rod is provided with a stud tension cylinder and is tensioned simultaneously.
Lower occupation is possible. However, increasingly make sure that the force is evenly increased in steps along the contour of the object to be tensioned.

Stud tension cylinders - including cylinder bridge			
model	HHX 14	HHX 22	HHX 35
art no	110.011.101	110.011.002	110.011.012
working pressure bars/Mpa	1000 / 100	1000 / 100	1000 / 100
capacity kN/t	140 / 14.3	221 / 22.5	352 / 35.9
stroke length mm	8	8	8
oil content cm^3	11.2	17.7	28.2
incl. coupler	A 239 male	A 239 male	A 239 male
maintenance set art no	110.013.081	110.013.001	110.013.011

Stud tension cylinders - including cylinder bridge (dimensions)			
model	HHX 14	HHX 22	HHX 35
A mm	70	90	100
B mm	36	47	52
C mm	85	80	80
D mm	28	30	35
E mm	56	76	87
F mm	47	60	72
G mm	58	53	52.5
H mm	28	30	35
K mm	6	8	8
L mm	20	20	20

Accessories			
model	HHX 14	HHX 22	HHX 35
pulling nut model	PN 14	PN 22	PN 35
nut socket model	NS 14	NS 22	NS 35
tommy bar art no	110.181.090	110.181.091	110.181.091

Stud tension cylinders including cylinder bridge

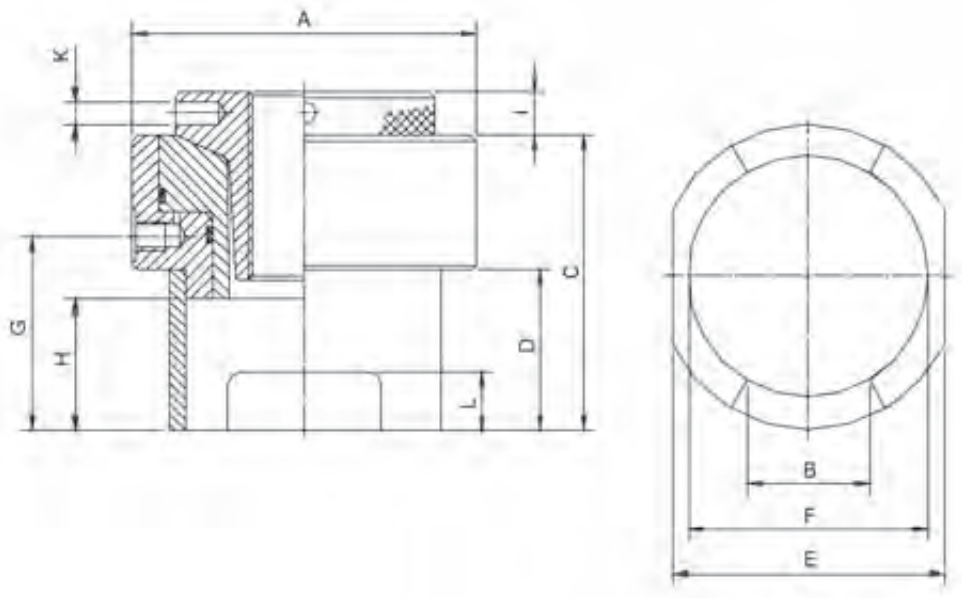


Stud tension cylinders - excluding cylinder bridge							
model	HTX 50	HTX 70	HTX 100	HTX 150	HTX 180	HTX 220	HTX 260
art no	110.011.121	110.011.131	110.011.141	110.011.151	100.011.161	110.011.171	110.011.181
working pressure bars/Mpa	1000 / 100	1000 / 100	1000 / 100	1000 / 100	1000 / 100	1000 / 100	1000 / 100
capacity kN/t	501 / 51.1	702 / 71.6	999 / 101.8	1500 / 152.9	1803 / 183.8	2174 / 221.6	2601 / 265.1
stroke length mm	12	12	12	12	12	12	12
oil content cm^3	60.2	84.2	120	180	216	261	312
incl. coupler	A 239 male	A 239 male	A 239 male	A 239 male	A 239 male	A 239 male	A 239 male
maintenance set art no	110.013.021	110.013.031	110.013.041	110.013.051	110.013.061	110.013.091	110.013.071

Stud tension cylinders - exclusive cylinder bridge (dimensions)							
model	HTX 50	HTX 70	HTX 100	HTX 150	HTX 180	HTX 220	HTX 260
A mm	119	139	166	203	220	248	270
B mm	60	56	65	79	85	92	99
C mm	102	107	120	139	150	165	195
D mm	55	60	70	85	90	95	115
E mm	96	111	125	154	174	186	228
F mm	83	94	112	136	148	156	170
G mm	67	72	82	98	103	110	128
H mm	45	50	60	75	80	85	105
K mm	8	10	10	12	12	12	16
L mm	20	25	30	35	40	40	40

Accessoiries							
model	HTX 50	HTX 70	HTX 100	HTX 150	HTX 180	HTX 220	HTX 260
cylinder bridge art no	110.181.151	110.181.152	110.181.153	110.181.154	110.181.155	110.181.156	110.181.157
pulling nut model	PN 50	PN 70	PN 100	PN 150	PN 180	PN 220	PN 260
nut socket model	NS 50	NS 70	NS 100	NS 150	NS 180	NS 220	NS 260
tommy bar art no	110.181.091	110.181.092	110.181.092	110.181.093	110.181.093	110.181.093	110.181.094

Stud tension cylinders excluding cylinder bridge



Specifications / important properties

- HHX cylinders standard provided with cylinder seat
- HHX cylinders standard not provided with cylinder seat, see accessories
- compact and lightweight
- usable in all positions
- high-quality and refined chrome nickel steel
- automatically locking quick coupler
- pulling nut is manufactured in conformity with customer specifications based on exact thread and bolt dimensions
- nut socket is manufactured in conformity with customer specifications based on exact key size of the nut
- advantages compared with traditional stud tensioning methods
  - the effects of friction are negligible; higher accuracy when tightening the bolt
  - time-saving; several cylinders can be coupled for simultaneously tensioning several bolt connections

Available on request

- stud tension cylinders manufactured in conformity with customer specifications
- extended pulling nut
- heightened or lowered bridges (HTX)

Pumps	pag. 127
Hydraulic hoses	pag. 127
Couplers	pag. 128
Accessories	pag. 128

HHX 22 + pulling nut

HHX 35 + pulling nut

HTX 100 + cylinder seat + pulling nut

HTX 100 + cylinder seat

Pumps - 2-stage - single-acting		
type	hand pump	foot pump
model	HTWX 1800 BU	FTWX 1800 BU
art no	110.142.003	110.142.004
working pressure bars/Mpa	1000 / 100	1000 / 100
max. operating force kg	36	36
output 1st stage cm^3/stroke	28	28
output 2nd trap cm^3/strpke	1.6	1.6
max. pressure 1st stage bars	45	45
effective oil content cm^3	1800	1800
weight incl. oil kg	9.3	10.2
incl. coupler	A 238 female	A 238 female
maintenance set art no	110.143.007	110.143.007

Single hoses 1000 bars			
model	X 1.2 M	X 3 M	X 5 M
art no	110.571.012	110.571.030	110.571.050
length m	1.2	3	5
connection	¼" BSP male (2x)	¼" BSP male (2x)	¼" BSP male (2x)

Extension hoses 1000 bars			
model	X 1.2 MU	X 3 MU	X 5 MU
art no	110.572.012	110.572.030	110.572.050
length m	1.2	3	5
connection	A 239 male (2x)	A 239 male (2x)	A 239 male (2x)

Specifications / important properties

- pumps:
  - suitable for large volumes
  - low power required while pumping; first stage will be fully pressureless after switch to second stage
  - automatic transition from first to second stage
  - large oil output per stroke
  - provided with dipstick
- hydraulic hoses:
  - anti-kink springs on both sides
  - 4:1 safety ratio
  - colour: blue

HTWX 1800 BU

Couplers

image	description	model	art no
	quick coupler, female, including aluminium dust cap • connection: ¼" BSP female • fits: A 239	A 238	150.581.238
	as A 238, but with extra lock ring	A 240	150.581.240
	quick coupler, male, including aluminium dust cap • connection: ¼" BSP female • fits: A 238 and A 240	A 239	150.581.239
	2 aluminium dust caps, 1 male and 1 female • fits: A 238, A 239 and A 240	-	150.152.010

Accessories

image	description	model	art no
	pressure gauge, 0-1000 bars, including protection frame • pressure gauge Ø 162 mm • including quick coupler female, A 238	A 148 U	110.582.348
	coupling piece • including quick coupler female, A 238 (3x)	A 240 U	110.582.240