

## HydraulicPump

**HP**  
HydraulicPump

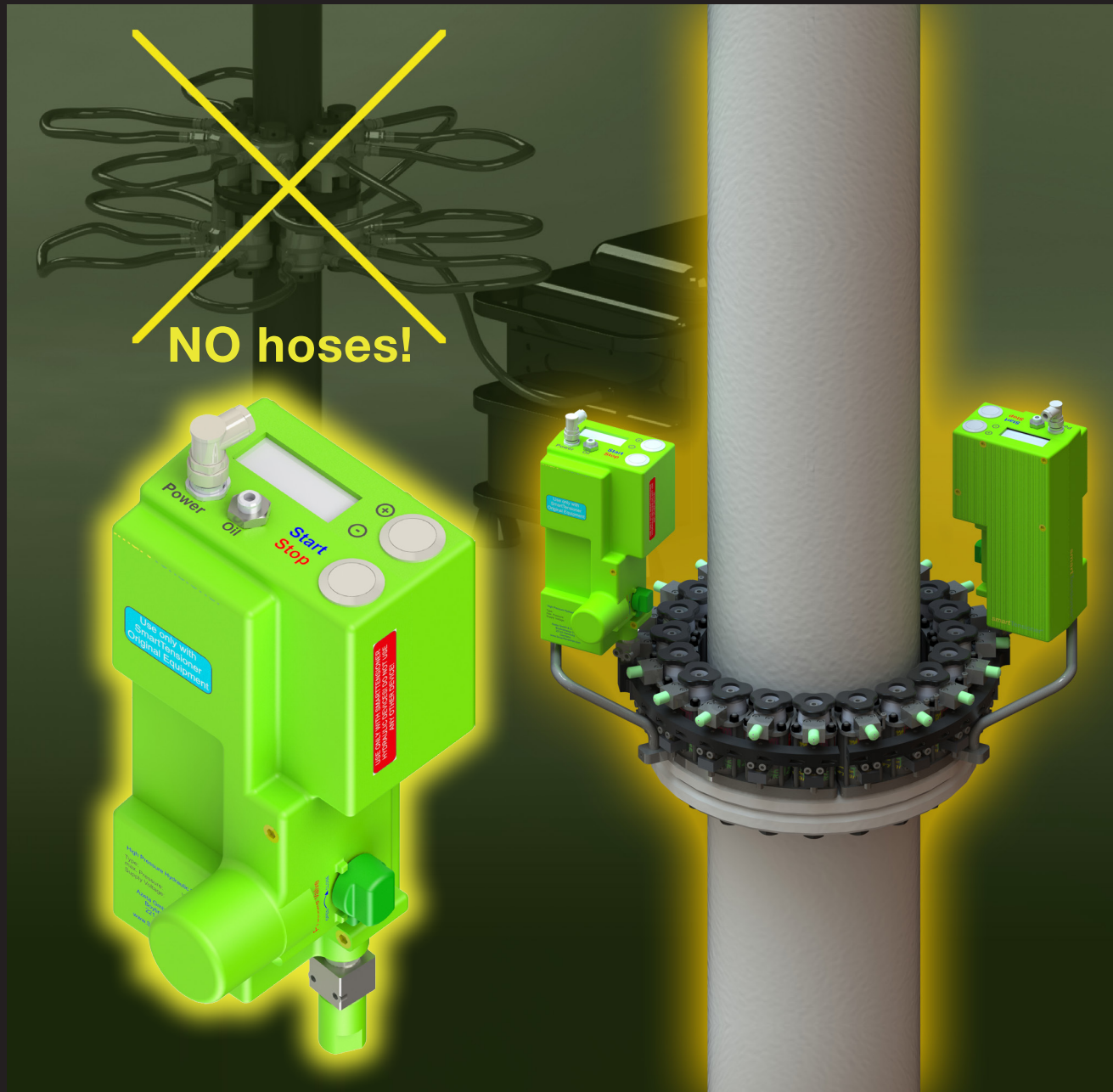
**STD**  
SubseaTensioningDevices

**IBT**  
IntegratedBoltTensioner

**BT**  
BoltTensioner

**HMTU**  
HydraulicMechanicTensioningUnit

**HTU**  
HydraulicTensioningUnit



**Innovations for bolt tensioning from Germany**

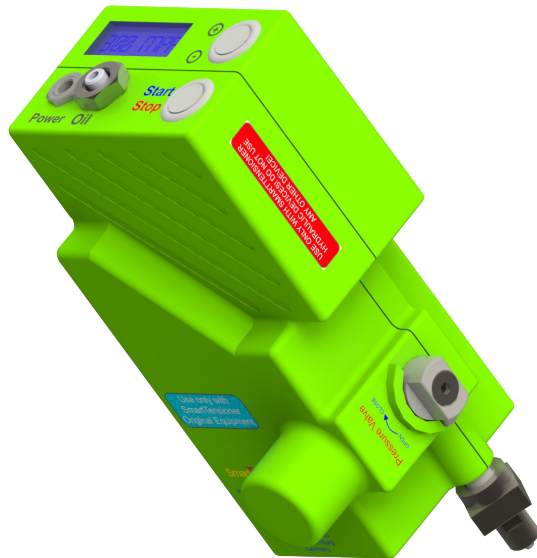
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# HP

## HydraulicPump

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PATENTS PENDING!



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**The smartTensioner HydraulicPump HP has been developed for the smartTensioner tensi-  
oning tools. It provides extremely high hydrau-  
lic pressure up to 300 MPa. It is lightweight  
and very easy to handle and to operate.**

### Two types available

Depending on your requirements, two different types of hydraulic pumps are available. The main difference between them is the weight (see table on right side). The maximum pressure for both pumps is 250 MPa.

The smaller pump (HP1) is somewhat slower and is suitable for smaller tensioning systems up to approximately M48 / 2".



**smartTensioner®**

### A pump for silicon oil

All smartTensioner devices operate with silicon oil as hydraulic medium. Oil with extremely high viscosity is needed to allow small and powerful tensioning devices. While other commercially available pumps are not able to pump these kinds of media, smartTensioner HP has been designed for this very objective.

### Operational safety

All smartTensioner devices provide a maximum in operational safety. Despite the high hydraulic pressures, risk is minimized because the amount of pressurized oil is very low.

Even a sudden failure will not lead to serious damage.

### Compact and clever

The HP is a fully integrated hand-held device that includes the pump mechanism, the PLC, a simple UserInterface and a tank for the hydraulic medium. Electric energy must be supplied from an external net adapter (included).

### More modern technology

One of the main reasons to use hydraulic bolt tensioning is to ensure equal forces in all bolts and evenly tensed and tight flanges. This is usually done by means of hydraulic nuts or bolt tensioners that are connected to each other by high-pressure hoses and one hydraulic pump.

smartTensioner uses more modern technology: instead of one pump serving all tensioning devices, we use several, much smaller and lighter pumps that are mounted directly on the tensioning devices. All pumps include a sophisticated pressure sensor and communicate wirelessly with a central control device, such as a regular PC.

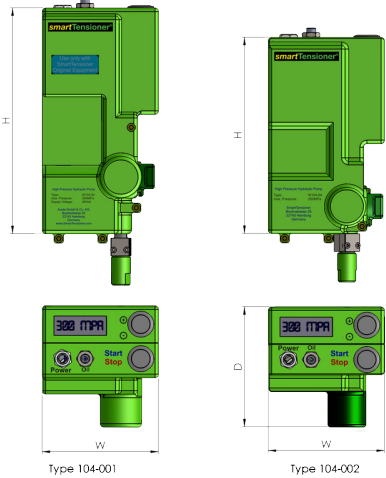
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# The tiny heart of our innovations

## Specifications

Type	Part.-No.	Max. pressure [MPa]	Height H [mm]	Width W [mm]	Depth D [mm]	Weight (kg)
HP 1	104-001	250.0	166.0	98.0	103	1.5
HP 2	104-002	250.0	191.0	98.0	103	2.6

Typical times to reach 250 MPa [minutes]:			
Tensioning device size		HP1	HP2
M8	1/4"	0.5	0.5
M16	5/8"	0.75	0.5
M24	1"	2	1.5
M33	1 1/4"	3	2.5
M48	1 7/8"	8	4
M56	2 1/8"	12	6
M72	2 3/4"	22	10
M100	4"	30	12



## Hydraulic piston return

With smartTensioner HP-PR the pistons of many smartTensioner devices can be returned hydraulically. The technology is simple and easy to operate.

## Smart hydraulic system

smartTensioner HP has an integrated oil tank that provides sufficient oil for many pump operations. If the HP stays connected to a tensioning device, the tank will never need to be refilled since the oil in the pump and in the tensioning device forms a closed circuit. If the pump is used with several different tensioning devices, a refill may sometimes be necessary.

When a refill is required, this is indicated on the display panel of the HP. With a special refill tool that is connected to the pump's oil connector, refilling is easy and can be done by the operating personnel.

## smartTensioner hydraulic media

The smartTensioner concept is based on the use of hydraulic media with very high viscosity. We have developed special fluids that support the smartTensioner sealings, even to permanently lock in high pressure as in the HTU. Our hydraulic media are nontoxic, non-flammable and chemically inert. They do not include mineral oils of any kind.

## smartTensioner software

Our HydraulicPump is perfectly supported by our software. All HPs communicate wirelessly with a central PC. With our software, the operator can monitor the current pressures in all connected pumps at all times. All parameters and the start/stop of each HP can be defined with an easy-to-use interface. Unexpected behaviour on one or several HPs, e.g. due to sealing failure, is detected immediately.

## Advantages of our hydraulic system:

### Reduced assembly and disassembly time

No hoses need to be transported, no hoses need to be connected. The power cord simply needs to be connected to the tensioning devices and the PC needs to be booted. That's it!

### Reduced risk of malfunction

Commercially available tensioning systems require connecting multiple hoses with each other. If one of these many connections is not tight, tensioning is not possible. This is not a problem with smartTensioner technology since the units do not depend on each other.

### No big, heavy high-pressure pumps

No high-voltage supply is necessary. Accumulator or battery-driven solutions are available. No need to transport heavy high-pressure pumps.

### Precise and bolt-specific monitoring and pressure

Each HP is equipped with a pressure sensor. It allows each tensioning unit to operate independently: retensioning is possible on individual bolts where required, the exchange of bolts or nuts during the tensioning process is possible, and even individual bolt forces are possible in critical areas of flanges, e.g. on turbine housings or with geometrically irregular flanges. Bolts with different diameters can be adjusted in one tensioning process.

### Clean room suitable

Our hydraulics are a completely closed circuit. No hoses are used, no connectors are needed. The hydraulic volumes are small. This all prevents hydraulic leakages. In addition, especially our tensioning devices for smaller threads as well as our pump have smooth surfaces that can be cleaned easily.

### Lower costs!

The best thing about smartTensioner is that it doesn't increase tensioning costs! Even if the labour costs (which are much lower using smartTensioner) are not taken into account, the equipment costs of smartTensioner devices including individual pump is lower than that of tensioner, hoses, connectors and pump. SmartTensioner HP costs approximately the same as one high-pressure hose with connectors.

# Tools for highly loaded bolted connections.

## Our products:

### HTU

HydraulicTensioningUnit

M8 - M200 / 1/4" – 8"



The HTU replaces conventional (hexagonal) nuts. The bolt force is locked hydraulically.

### HMTU

HydraulicMechanicTensioningUnit

M22 - M200 / 7/8" – 8"



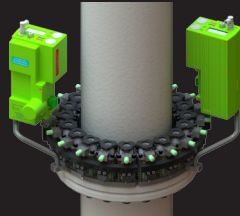
The HTU replaces conventional (hexagonal) nuts. The bolt force is locked mechanically.

### BT & CFBT

BoltTensioner

CompactFlangeBoltTensioner

M08 - M100 / 1/4" – 4"



The conventional (hexagonal) nut remains on the bolt. Bolt strained torque-free with Bolt-Tensioner. Nut is turned by manually.

### IBT

IntegratedBoltTensioner

M30 - M64 / 1 1/8" – 2 1/2"



Made for tensioning situations where extremely high bolt forces are needed and very little free area on the flange is available.

### STD

SubseaTensioningDevices

M8 - M200 / 1/4" – 8"



Made for environments where handling is very difficult, e.g. in subsea-projects.

### HP

HydraulicPump



The heart of our innovations: Very high pressure, low pressurized volume. Perfect for bolt tensioning!

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