PATENT CLAIMS

1. Hydraulic cylinder unit (100) for connection to a wire line riser tensioner system (30), comprising

- a hydraulic cylinder (1) being separated in a first cylinder chamber (1') and a second cylinder chamber (1'') by at least one cylinder piston (2) comprising a piston rod (2') and a piston head (2''),
- a low pressure tank (10) having a desired pressure,
- at least one first conduit (11) arranged to provide fluid communication means between the low pressure tank (10) and the first cylinder chamber (1'), wherein the low pressure tank (10) is a closed cylinder into which the first conduit (11) is inserted,
- a high pressure fluid reservoir (5), and
- at least one second conduit (8) being arranged to provide fluid communication means between the high pressure fluid reservoir (5) and the second cylinder chamber (1''),

characterized in that the cylinder unit (100) further comprises

- at least one feedback conduit (13) being arranged to provide direct fluid communication between the first cylinder chamber (1') and the second cylinder chamber (1''), and
- valve means (14) comprising at least one valve, the valve means (14) being in fluid communication with the at least one second conduit (11) and the at least one feedback conduit (13), and arranged to provide reversible switching between the following alternative configurations:
  - fluid obstruction between the low pressure tank (10) and the first cylinder chamber (1'), and fluid communication between the first cylinder chamber (1') and the second cylinder chamber (1'') via the at least one feedback conduit (13), and
  - fluid obstruction between the first cylinder chamber (1') and the second cylinder chamber (1''), and fluid communication between the low pressure tank (10) and the first cylinder chamber (1') via the at least one first conduit (11).

2. Hydraulic cylinder unit (100) according to claim 1, **characterized in that** at least one of the valves constituting the valve means (14) is arranged in the at least one first conduit (11).

3. Hydraulic cylinder unit (100) according to one of the preceding claims, **characterized in that** at the valve means (14) comprises a three-way valve.

4. Hydraulic cylinder unit (100) according to one of the preceding claims, **characterized in that** at the valve means (14) comprises

at least one valve (14) being arranged in fluid communication on the at least one first conduit (11) and

at least one valve (14) being arranged in fluid communication on the at least one feedback conduit (13).

5. Hydraulic cylinder unit (100) according to one of the preceding claims, **characterized in that** said piston rod (2') is arranged in the first cylinder chamber (1').

6. Hydraulic cylinder unit (100) according to one of the preceding claims, **characterized in that** the cylinder unit (100) further comprises

at least one first sheave (3) being arranged at one of the two axial sides of the first cylinder chamber (1), and

at least one second sheave (4) being arranged at the other of the two axial side of the first cylinder chamber (1),

the sheaves (3,4) being configured to receive a riser tensioning cable (15) connectable to one end of a riser (40) during use.

7. Hydraulic cylinder unit (100) according to one of the claims 1-5, **characterized in that** the cylinder unit (100) further comprises

at least two first sheaves (3) being arranged at one of the two axial sides of the first cylinder chamber (1), and

at least two second sheaves (4) being arranged at the other of the two axial side of the first cylinder chamber (1),

the sheaves (3,4) being configured to receive a riser tensioning cable (15) connectable to one end of a riser (40) during use.

8. Hydraulic cylinder unit (100) according to one of the preceding claims, **characterized in that** the high pressure fluid reservoir (5) is being separated in a high pressure gas end (5') and a high pressure fluid end (5'') by a reservoir piston (7),

the high pressure fluid end (5'') being arranged in fluid communication with the second cylinder chamber (1'') by the at least one second conduit (8).

9. Hydraulic cylinder unit (100) according to claim 8, **characterized in that** the reservoir piston (7) is of type floating piston (7).

10. Method for switching a hydraulic cylinder unit (100) between a hydraulic cylinder unit with low tension capabilities and a hydraulic cylinder unit with high tension capabilities,
characterized by
- operating the valve means (14) in a hydraulic cylinder unit (100) in accordance with one of claims 1-9 to allow fluid communication between the first cylinder chamber (1') and the second cylinder chamber (1'') via the at least one feedback conduit (13), and simultaneously to prohibit fluid communication between the first cylinder chamber (1') and the low pressure tank (10), to provide a hydraulic cylinder unit (100) with low tension capabilities, and
- operating the valve means (14) in a hydraulic cylinder unit (100) in accordance with one of claims 1-9 to prohibit fluid communication between the first cylinder chamber (1') and the second cylinder chamber (1''), and simultaneously to allow fluid communication between the first cylinder chamber (1') and the low pressure tank (10) to provide a hydraulic cylinder unit (100) with high tension capabilities.

11. Wire line riser tensioning system (30) for a riser (40) connected to a floating platform, **characterized in that** the system (30) comprises
a multiple of individually operated hydraulic cylinder assemblies (200) composed of at least one hydraulic cylinder unit (100) in accordance with one of the claims 1-9,
said multiple of assemblies (200) being connected to a riser (40) by at least one riser tensioning cable (15) during use,
wherein the pressure supplied to the second cylinder chamber (1'') via the high pressure fluid reservoir (5) is automatically adjusted as a response to the riser induced force on the cylinder piston (1) caused by the movement of the floating platform, thereby ensuring an approximately geostationary riser positioning.

12. Riser tensioner system in accordance with claim 11, **characterized in that** at least one of the individually operated hydraulic cylinder assemblies (200) comprises at least two hydraulic cylinder units (100) in accordance with

one of claims 1-9.