GB

OMARLIFT

MADE IN ITALY

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05	06/02/2024	2-18	Updated configurations for 125l/min pump
05	06/02/2024	3-2	Screw M18 on C97-80 side acting cylinder
05	06/02/2024	3-5	Updated CS Ø 110
05	06/02/2024	3-7, 3-8, 3-9	Updated cylinders weight
05	06/02/2024	4-28	Added code 8H102910
05	06/02/2024	5-15	Electrical wiring image
05	06/02/2024	6-2	Modified measures M2x, M2y on 60/S and 110/S tank
05	06/02/2024	6-4	Updated submerged motor 4.1kW data
05	06/02/2024	7-17	Added table for telescopic cylinders arms.
05	06/02/2024	8-3, 8-4, 8-7, 8-8	Image modified and screw nr.15 indication added
05	06/02/2024	8-10	Added row for cabinet for 60/S with HDU Cod.8H203099 and removed 60/S type from cabinet Cod.8H202437
05	06/02/2024	8-14	VP HC 034 fixing hole spacing on C97 cylinder

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1 GENERAL INFORMATION

OMARLIFT hydraulic installations are guarantee of safety and quality as they are produced according to the dispositions of standards (EN 81-2 and EN 81-20/50). Moreover, OMARLIFT boasts the CE certification on rupture valves and unintended car movement devices (UCM) according to European Lift Directive 95/16/EC and 2014/33/EU (starting validity from 20/4/2016) and the certification from TÜV Süd Notified Body.

1.1 OPERATING PRINCIPLES

In the hydraulic lift the oil under pressure transmits the power.
During the upward movement the electric motor makes the pump turn. The pump sends the oil under pressure from the tank to the cylinder. The cylinder connected directly or indirectly to the car, determines the lift upward movement.
During the downward movement the electric motor is still. The car weight and its support (frame) together with the possible car load make the lift go down. In this phase the oil returns to the tank without electric energy consumption.
Both during the upward and downward movements, the running oil is controlled by the valve group which also monitors the lift speed from the start until the arrival at the floor. The cylinder pushes the car upwards from the bottom and bears it, discharging all the efforts to the ground, on the pit bottom.

1.2 ADVANTAGES OF THE HYDRAULIC LIFT

- There is no machine room on the roof and the pump unit can be set everywhere in the building.
- It is always firmly set on the ground, where it discharges all its weight, without stressing the shaft walls.
- The car is not suspended at the roof and, since it is pushed from the bottom, it can also reach top-floors and terraces.
- It hasn’t any counterweight, so it exploits all the space of the travel shaft.
- It doesn’t need bearing walls and therefore can be installed always and everywhere, even in existing or restored buildings, or in stairwells.
- If installed, the automatic emergency is always able to take the lift to the floor in case of current shortages, avoiding the risk to remain shut into the car.
- It needs little maintenance, it is safe, reliable, comfortable and noiseless.

1.3 OIL CHOICE

1.3.1 GENERAL CHARACTERISTICS

Oil plays an important role in the hydraulic installation.
In fact, its stability assures the good working of the hydraulic lift, in particular when it is subject to high traffic or sudden temperature variations. Following properties are required for a good – quality oil:

a) **VISCOSITY at 40° C** (recommended indicative values):
- 46 cSt for installations working at low temperatures, in particular during the first starts in the morning.
- 68 cSt for installations working at high temperatures, especially if due to high traffic.

b) **VISCOSITY INDEX** (high viscosity index = reduced viscosity variations caused by temperature change):
- V.I. 180 suitable for medium/high and high traffic.
- V.I. 150 suitable for low and medium traffic.

c) FLASH POINT: > 190° C
d) POUR POINT: < -30° C
e) SPECIFIC WEIGHT AT 15° C: 0,88 kg/dm^3
f) AIR RELEASE AT 50° C: < 10 min.
g) ADDITIVES: Anti–oxidation, Anti–corrosion, Anti–wear, Anti–rust, Anti–emulsion

OIL [cSt] at 40° C	VISCOSITY INDEX (± 5%)	PERFORMANCE
46 46 46	101 140 160	★ ★★ ★★★
68	>140	High Temp / High traffic

1.3.2 OIL LIFE

Oil lifetime is a question very difficult to investigate and define, because it depends essentially from the ambient conditions during the operating time (in terms of temperature, humidity and powder), and from the effective value of working hours during the period.

- Working at high temperature (more than 55°C), or with high frequency of overheating occurrences which cause the intervention of the thermal protection devices, deeply increases the oil degradation.
- ⚠ In case of short circuit of the electric motor (for the submerged solutions), the oil must be mandatorily changed and the tank cleaned to remove any metallic particles.
- At least once a year and anyway every 2000 working hours, check the oil conditions: smell, color, foam, metallic or dirt particles, etc. If necessary even using an investigation from an oil-specialized laboratory.
- In normal working conditions, without any previous described factors, the oil lifetime could be estimated in 3000-5000h of effective working operation; in every case even if these values are not reached, it should be evaluated to completely replace the entire oil amount (tank+cylinder) every 5 years and mandatorily every 10 years.

1.3.3 WARNINGS

a) You have to use always oils with the highest viscosity index available (I.V. ≥ 150).
b) Observe anti – pollution instructions carefully.
   Waste oil and any oil – containing waste have to be put away in proper containers not to pollute the environment.
   Waste oil has to be disposed only by specialised companies.
c) Respect the oil inspection and change intervals
d) Don’t mix oils with different type, grade and V.I.

1.3.4 ECOLOGICAL OILS

Biodegradable oils, Ecological oils, "green" oils, based on esters and glycols, face to better performances in environmental compatibility, have in general specific and strict requirements and could be not compatible with for instance polyurethane gaskets (PU) or they can be aggressive on the materials and seals, creating rubbers, sludge, rust which don't allow an adequate function of the valves (in terms of both: availability and comfort) and of the electric motors

These products require also increased costs for periodic inspection activities and more frequent substitution.



The type, gravity and timing after which the degradation phenomena could manifest themselves, depend to operating and ambient conditions, in addition to the type of oil employed, varying between some months till some years.

⚠ **It is not possible to freely fill-in your hydraulic system with whatever ecological fluid, in order to match ecological performances with adequate guarantee of functionality, in especial case by maintaining the standard existing procedures for check-up, surveillance and oil change.**

The use of these kind of fluids has to be intended as a solution when other ways cannot be pursued and it is always advisable to contact OMARLIFT for a risks assessment.

OMARLIFT propose on request for specific applications, a fluid compatible with materials used in its components and complete systems.

ENI Arnica S 46, is a synthetic and biodegradable fluid, destined to use in installations particularly exposed to fire risk and of environmental pollution of the soil. It is formulated starting from synthetic base (organic esters), suitably additived (ISO-L-HFDU Classification), and it is ecologic thanks to biodegradability level (OECD 308B), assuring also high viscosity index

- Viscosity at 40°C : 48cSt (ISO46)
- Viscosity index: 186
- Flash point: 305°C
- Pour point: -36°C
- Density at 15°C: 0,921kg/l
- BIODEGRADABILITY >70% (OECD301B)

To receive any information about the possibility of application, the timing for inspection and for complete change for your specific application, you can contact the OMARLIFT Commercial department

1.4 HYDRAULIC INSTALLATIONS SILENCE

The NL valve group on OMARLIFT pump unit is equipped with a patented silencer kit.
OMARLIFT pump units are remarkably noiseless:
under average working conditions, i.e. with an oil temperature of about 30/40° C, pressure 25/30 bar and no air in the oil, the noise produced by the pump unit is included in the below limits:

PUMP UNIT TYPE	**50 Hz**	**60 Hz**
▪ Up to 150 l/min :	57 ÷ 59 dB(A)	62 dB(A)
▪ From 180 up to 300 l/min :	59 ÷ 61 dB(A)	64 dB(A)
▪ From 360 to 600 l/min :	60 ÷ 64 dB(A)	67 dB(A)
▪ HOMELIFT (external motor)	62 dB(A)	65 dB(A)

These values refer to the upward travel phase at high speed.

⚠ Noise values means at one meter of distance and at the same height of the valve. The values are referred to the test in the test room OMARLIFT.

To have an installation as silent as possible it's necessary to:

Use a piece of flexible hose (5/6 metres at least) to connect the pump unit to the cylinder.

By means of some thick rubber, insulate the connecting pipes from the collars used to fix the pipes to the walls.

Use some thick rubber to insulate the cylinder head from its fixing collar and the bottom from its support.

Fill in the thank till the maximum level allowed.

Make sure there is not too much air in the oil.
If necessary, purge the air.

Use oil with high viscosity index. The high oil temperature reduces its viscosity and increases the noise. A low oil viscosity doesn't allow to oil the moving parts and this may cause an increase of the noise.

1.5 MOTORS FOR LIFT PUMP UNITS

OMARLIFT electric motors for lift are asynchronous motors with 2 poles, available in 50 and 60Hz, 3AC configurations.

For applications under Lift Directive, OMARLIFT offers the motors only in submerged version, in which the motor works inside to the tank, submerged by the oil. This increase the thermal exchange and consent to reach better performances.

Operating conditions in terms of load, oil temperature and type, could affect the current absorption values, at the same voltage.

Below the nominal values:

THREE – PHASE MOTORS

NOMINAL POWER		Nominal current "In" with oil viscosity = 40 cSt				
		230 V 50 Hz	400 V 50 Hz	415 V 50 Hz	208 V 60 Hz	230 V 60 Hz
HP	kW	A	A	A	A	A
4,5	3,3	17	10	9	19	18
6,5	4,7	26	15	15	25	24
8	5,9	29	17	16	31	29
10,5	7,7	33	19	18	40	38
13	9,6	39	22	22	49	47
15	11	47	27	26	58	55
17	12,5	52	29	28	64	61
20	14,7	58	33	32	72	68
25	18,4	73	42	41	86	81
30	22	87	51	50	105	99
40	29,4	117	67	65	136	129
50	36,8	143	82	80	171	162
60	44	176	101	98	194	184
70	51,5	205	118	114	236	215
80	58,8	239	137	133	275	250

ATTENTION! THE MENTIONED CURRENTS ARE INDICATIVE ONLY. FOR OTHER POWERS OR VOLTAGES PLEASE CONSIDER A PROPORTIONAL CURRENT. IN EVERY CASE REFER TO THE MOTOR DATAPLATE.

1.6 MOTORS FOR HOMELIFT PUMP UNITS

HOMELIFT applications, under Machine Directive are available with both, submerged and external motors, always with 2 poles and in 50 or 60Hz, 1AC or 3AC configurations.

External motors, in face to better efficiency with lower current absorption, are subjected to increased overheating and they consent less cycle/h in respect to submerged ones.
OMARLIFT external motors comply to intermittent use, S3-10% class, under a cycle of 10min.

NOMINAL POWER		230 V 50 Hz 1AC	230 V 50 Hz 3AC	400 V 50 Hz 3AC	230 V 60 Hz 1AC	230 V 60 Hz 3AC	400 V 60 Hz 3AC	SUBMERG.	EXTERNAL
HP	kW	A	A	A	A	A	A		
2	1,5	16	7,8	4,5	18.5	11	6.5	x	
		9	6,2	3,6	-	6.2	3.6		x
2,5	1,8	18	11	6,5	20	12	7	x	
		13	7,6	4,4	-	7.6	4.4		x
3	2,2	21	12	7	23	14	8	x	
		15	10	5,8	-	11.4	6.6		x
3.5	2.6	24	14	8	27	15	9	x	
		-	-	-	-	-	-		x
4	2,9	27	16	9,2	29	17	10	x	
		17	13,2	7,6	18	12.8	7.4		x
4,5	3,3	29	17	10	34	18	11	x	
5	3.7	23	-	-	24	-	-		x
5.5	4,0	35	22	13	40	23	13	x	
6,5	4,8	41	26	15	45	26	15	x	

For more details about availability and configurations, please refer to chapter 6 HOMELIFT

⚠ ATTENTION! THE MENTIONED CURRENTS ARE INDICATIVE ONLY. FOR OTHER POWERS OR VOLTAGES PLEASE CONSIDER A PROPORTIONAL CURRENT. IN EVERY CASE REFER TO THE MOTOR DATAPLATE.

1.7 STARTING CURRENT

The starting current are higher than the nominal values and can be estimated as follows:

- SUBMERGE MOTORS

Starting current for direct start: Is ≈ 2,8 ÷ 3,5 In
Starting current for start λ – Δ: Is ≈ 1,6 ÷ 2,0 In
Starting current with soft starter: Is ≈ 1,4 ÷ 1,6 In

- EXTERNAL MOTORS

Starting current for direct start: Is ≈ 2,5 In

⚠ ATTENTION: values are indicative only. Refer to the technical characteristics and to the motor data plate.

2 HYDRAULIC COMPONENTS

2.1 CHOICE OF THE HYDRAULIC COMPONENTS

It is necessary to know the following data to choose correctly the cylinder (or the cylinders) and the pump unit of an hydraulic lift:

INPUT DATA:

- Useful car load.
- Total weight of car and frame.
- Total weight of pulley and ropes (only for indirect side acting cylinders).
- Car useful travel + total extra travel.
- Distance from pulley axis and its supporting point on the cylinder (only for indirect side acting cylinders).
- System of installation (direct or indirect side acting, one or more cylinders).
- Car nominal speed.
- Motor frequency and voltage, solenoid voltage.
- Type of motor start (direct or star/delta – soft starter).

Generally, the total car extra travel is about 500 mm for indirect installations, and about 350 mm for direct installations.

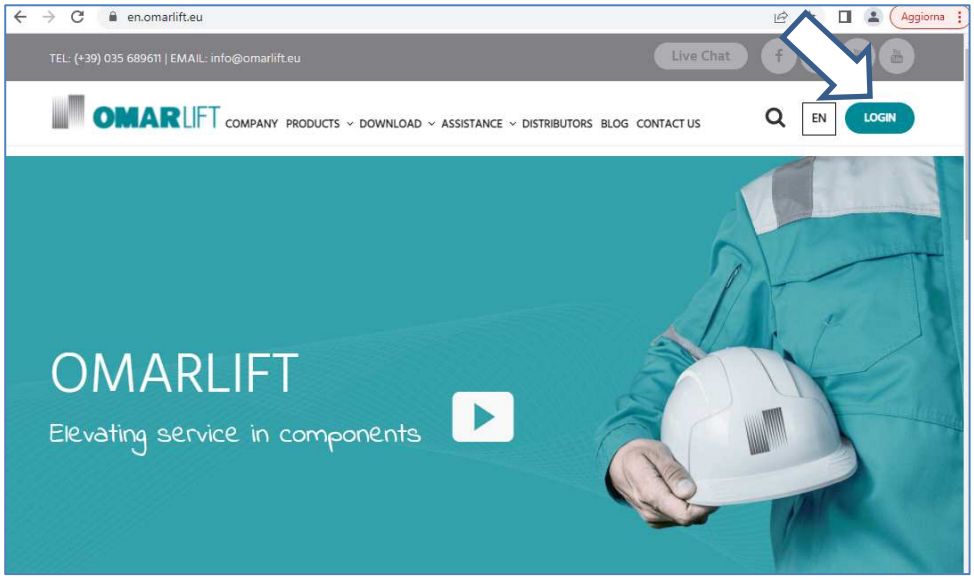
For telescopic cylinders the total extra travel could be:

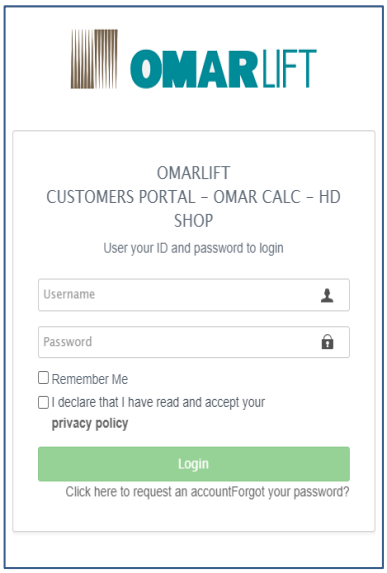
- 500 mm (minimum required 250mm) for two – stage telescopic cylinders.
- 600 mm (minimum required 350mm) for three – stage telescopic cylinders.

ONLINE CONFIGURATOR

Knowing the data requirements (input data), it is possible to proceed with the choice of the cylinder and of pump unit, directly using the online configurator available on OMARLIFT website (www.omarlift.eu).

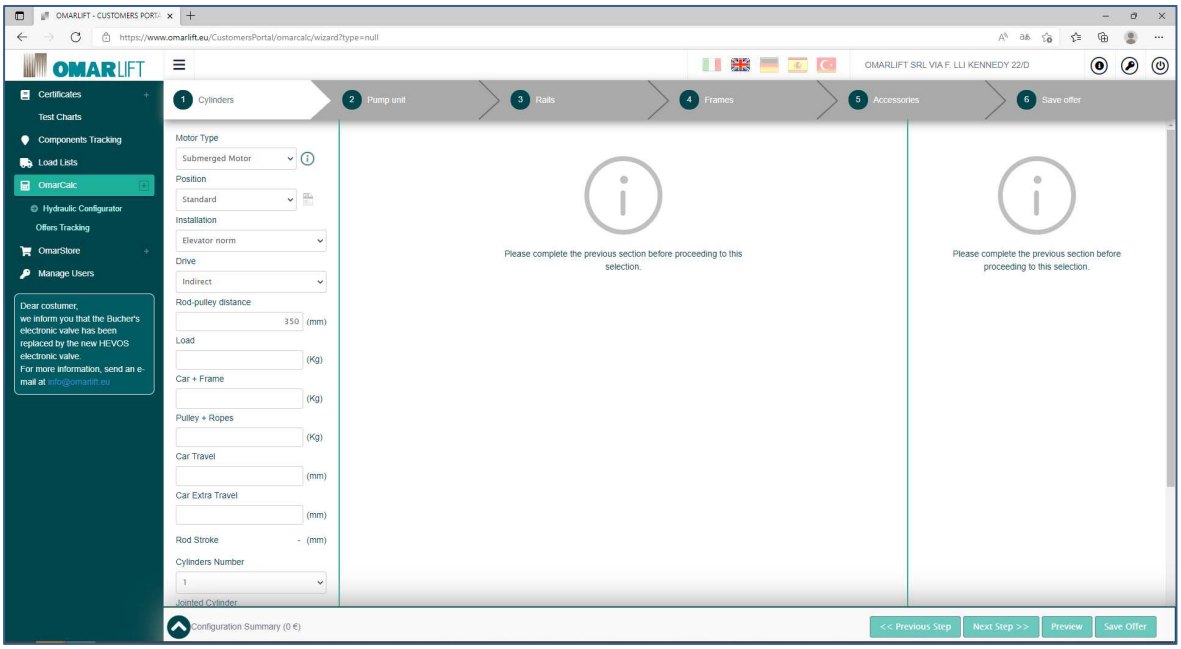
It is requested the access by pressing the push button LOGIN, using your ID and password. The first time, it is necessary to register yourself to the portal, giving a username and a password





After entering the configurator, fill-in the boxes with your data project, select *Auto* option for the automatic research of available options, choose the one of your interest and navigate between the menus with the push buttons at the bottom of the page.

You can view the available options and the related price, then you can choose all components as cylinder, pump unit, guides, in addition to frames and accessories, obtaining a complete cost estimation.



MANUAL CONFIGURATOR

Alternatively, you can manually choose the cylinder, using the tables shown below in the General Catalogue. Starting from the total weight and travel length, you choose the cylinder type and the maximum pressure, and from this value, joint with the requested speed, you define the pump unit (pump and motor) and last, the tank.

2.2 CYLINDER SIZING

a) CYLINDER TRAVEL (or cylinders)

- Ex. With one or two indirect side acting cylinders, roping 2:1
  Cylinder total travel = ½ (useful car travel + extra travel).
- Ex. With one or two direct central or side acting cylinders:
  cylinder total travel = useful car travel + car extra travel.

b) DIAMETER AND THICKNESS OF THE CYLINDER ROD
Rod diameter and thickness have to respect safety rules at buckling strength conditions and pressure limits.

This choice can be easily made using the safety diagrams at the buckling strength according to two dimensions:

- The total effective load on the rod.
- The free length for the buckling strength.

A safety level is reached choosing the points under the curves of the buckling strength diagrams.

⚠ Maximum static pressure has not to exceed the values in the graph related to the specific product.
This pressure value corresponds to the maximum static pressure allowed on the cylinder thickness according to the normative in force.

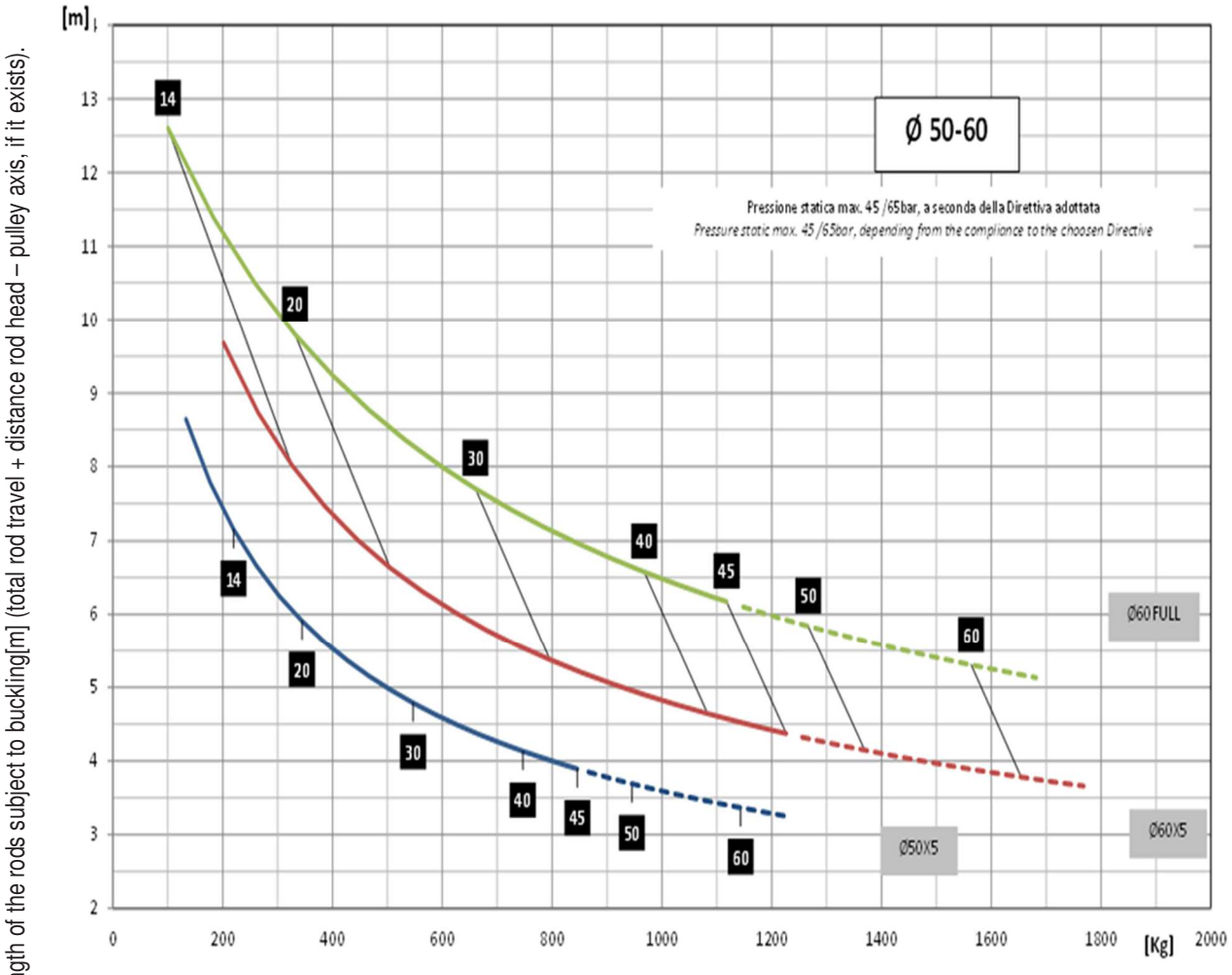
Minimum static pressure with empty car has not to be lower than 12 bar.
This value assures a correct installation working during the down travel if the charge loss along the feeding pipes or owing to frictions, do not exceed ¾ bar. In case a higher loss is estimated, it is necessary to increase the minimum pressure and adapt the motor power.

2.3 DIAGRAM OF BUCKLING STRENGHT OF THE ROD: C97, HC2 CYLINDERS

Diagrams of the buckling strength of the rods, according to standards EN 81-2, EN 81-20/50.

C97, HC2 CYLINDERS

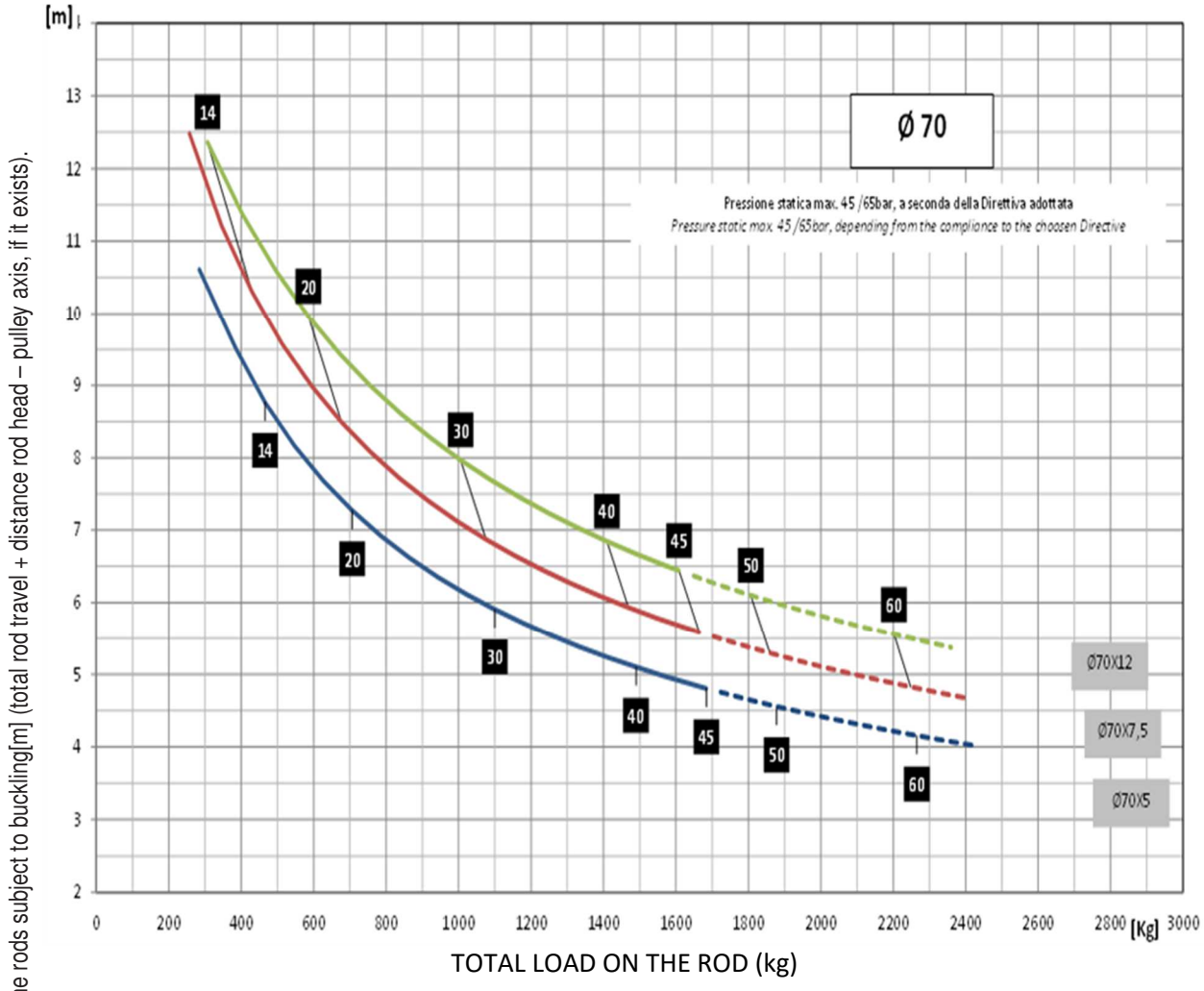
LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



⚠ The graphics are indicative only: if in doubt refer to the analytical calculation.

C97, HC2 CYLINDERS

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



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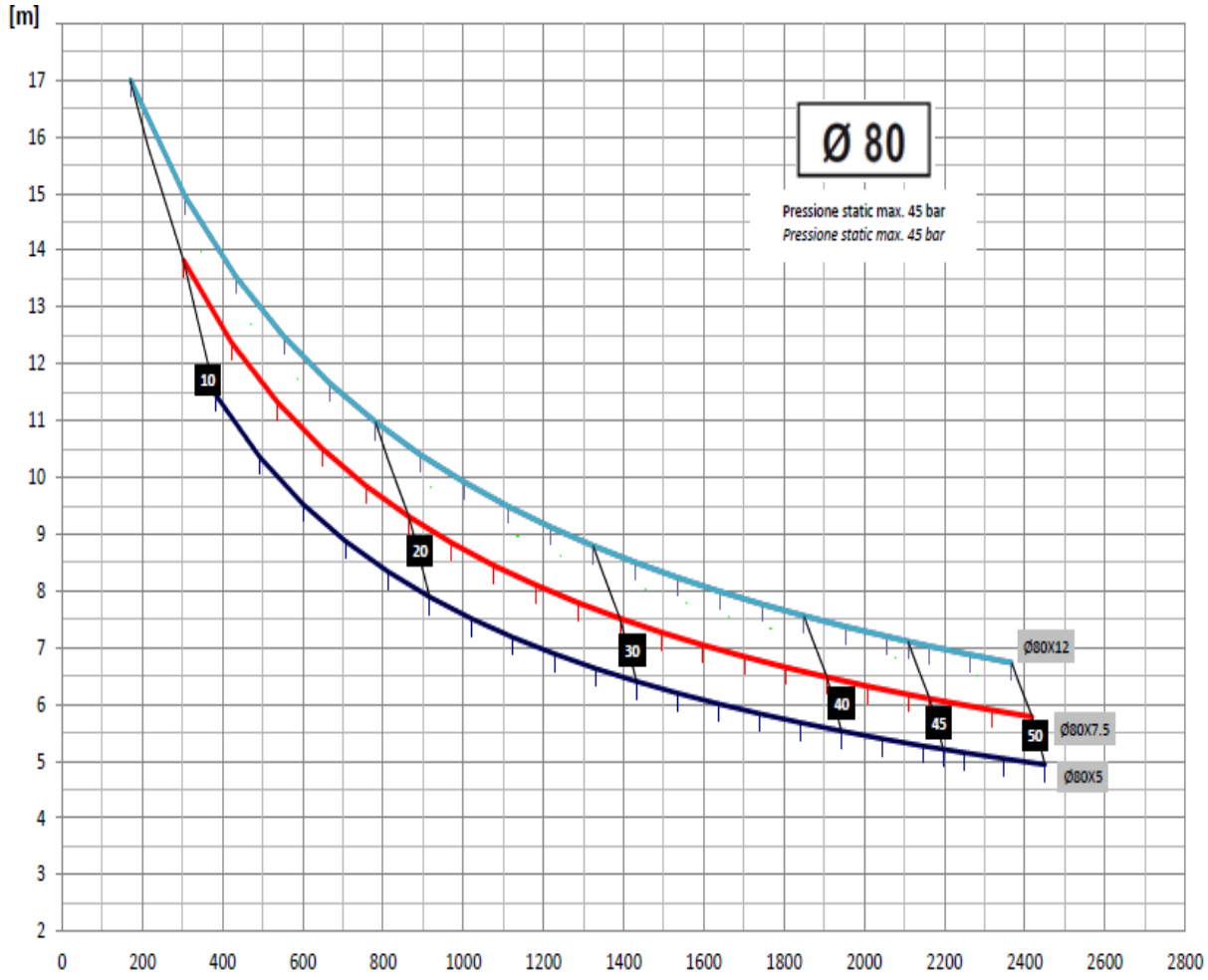
LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



TOTAL LOAD ON THE ROD (kg)

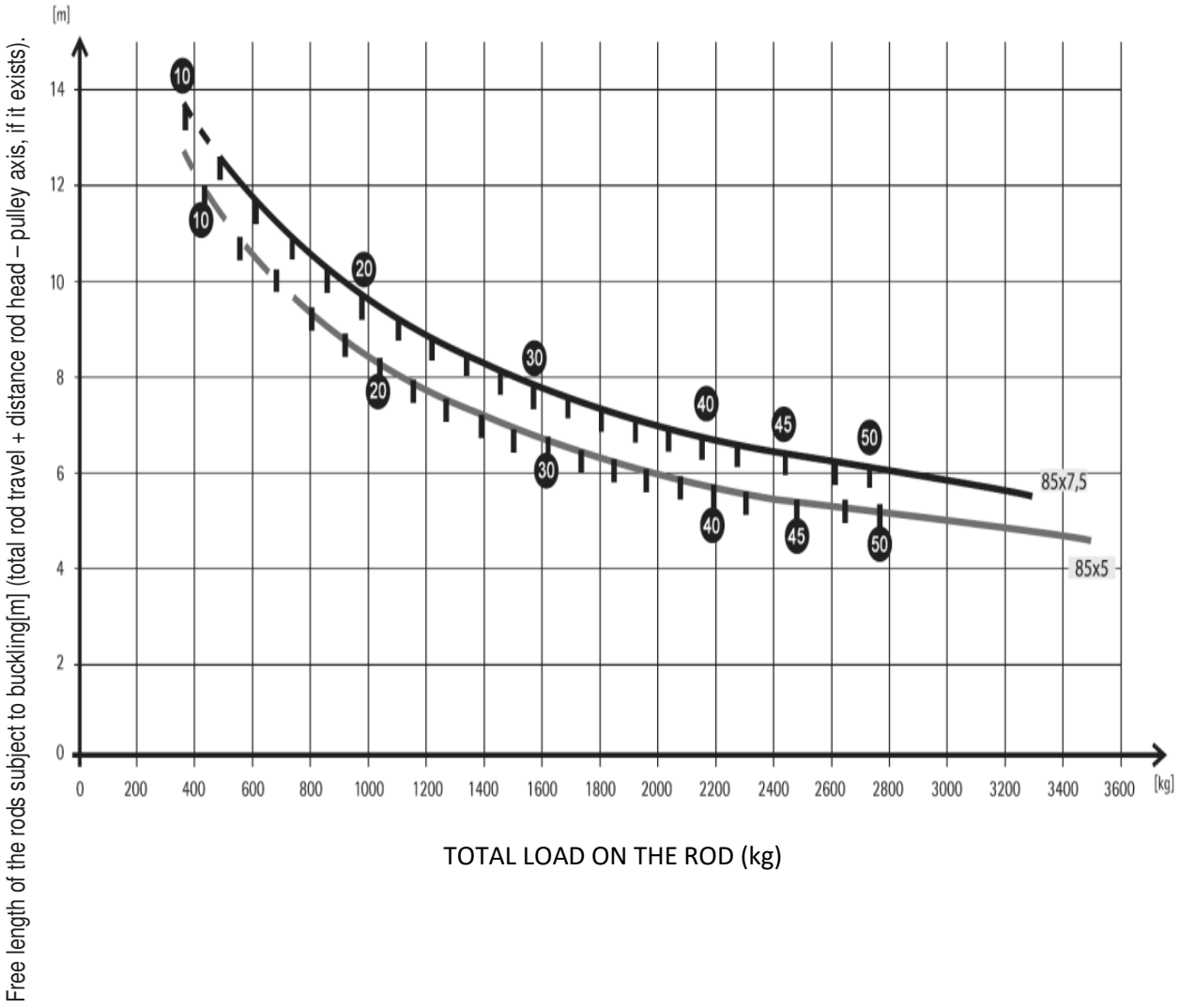
Free length of the rods subject to buckling[m] (total rod travel + distance rod head – pulley axis, if it exists).

⚠ The graphics are indicative only: if in doubt refer to the analytical calculation.

C97 CYLINDER

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*

Ø 85



TOTAL LOAD ON THE ROD (kg)

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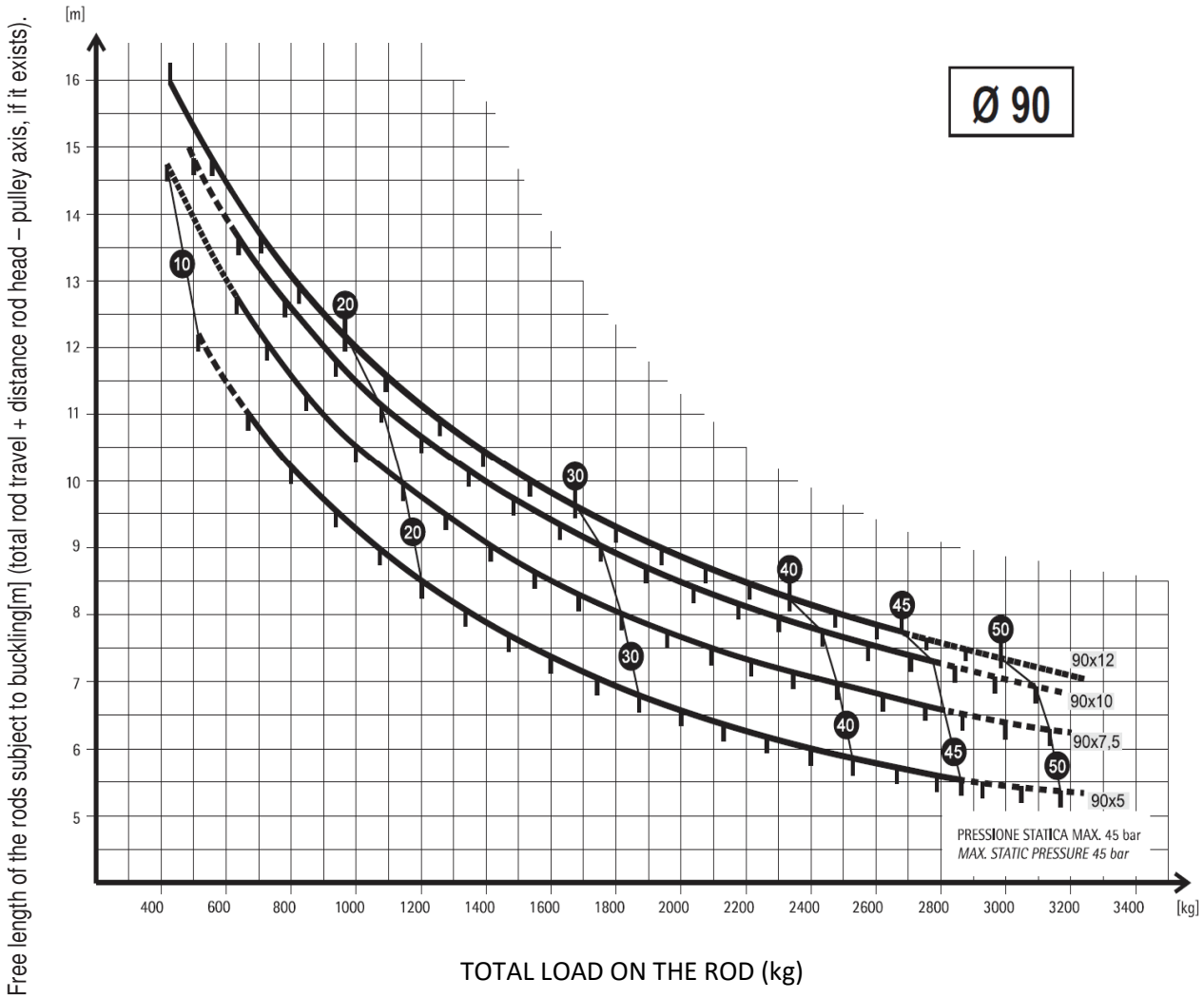
C97 CYLINDER

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



TOTAL LOAD ON THE ROD (kg)

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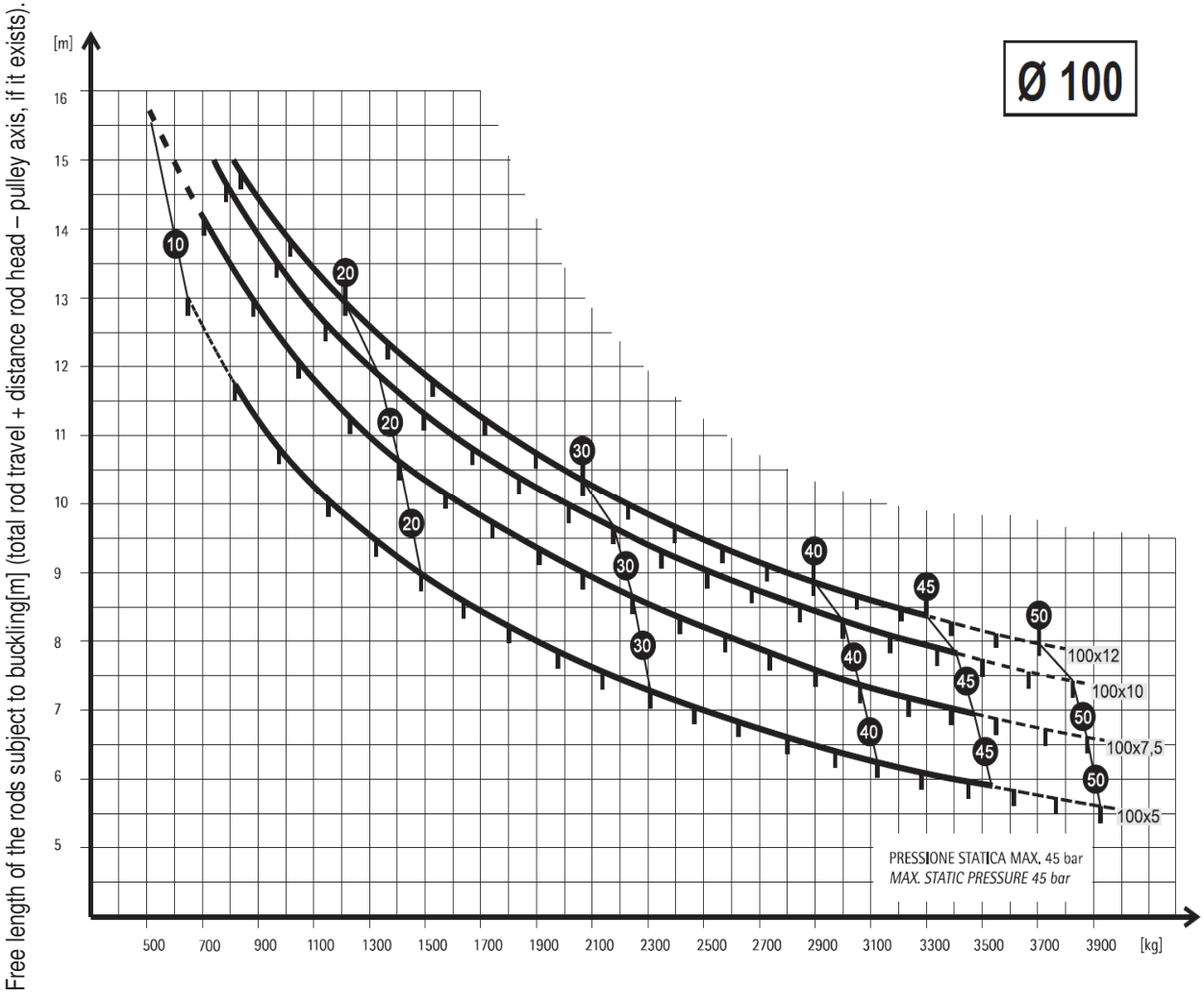
C97 CYLINDER

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



TOTAL LOAD ON THE ROD (kg)

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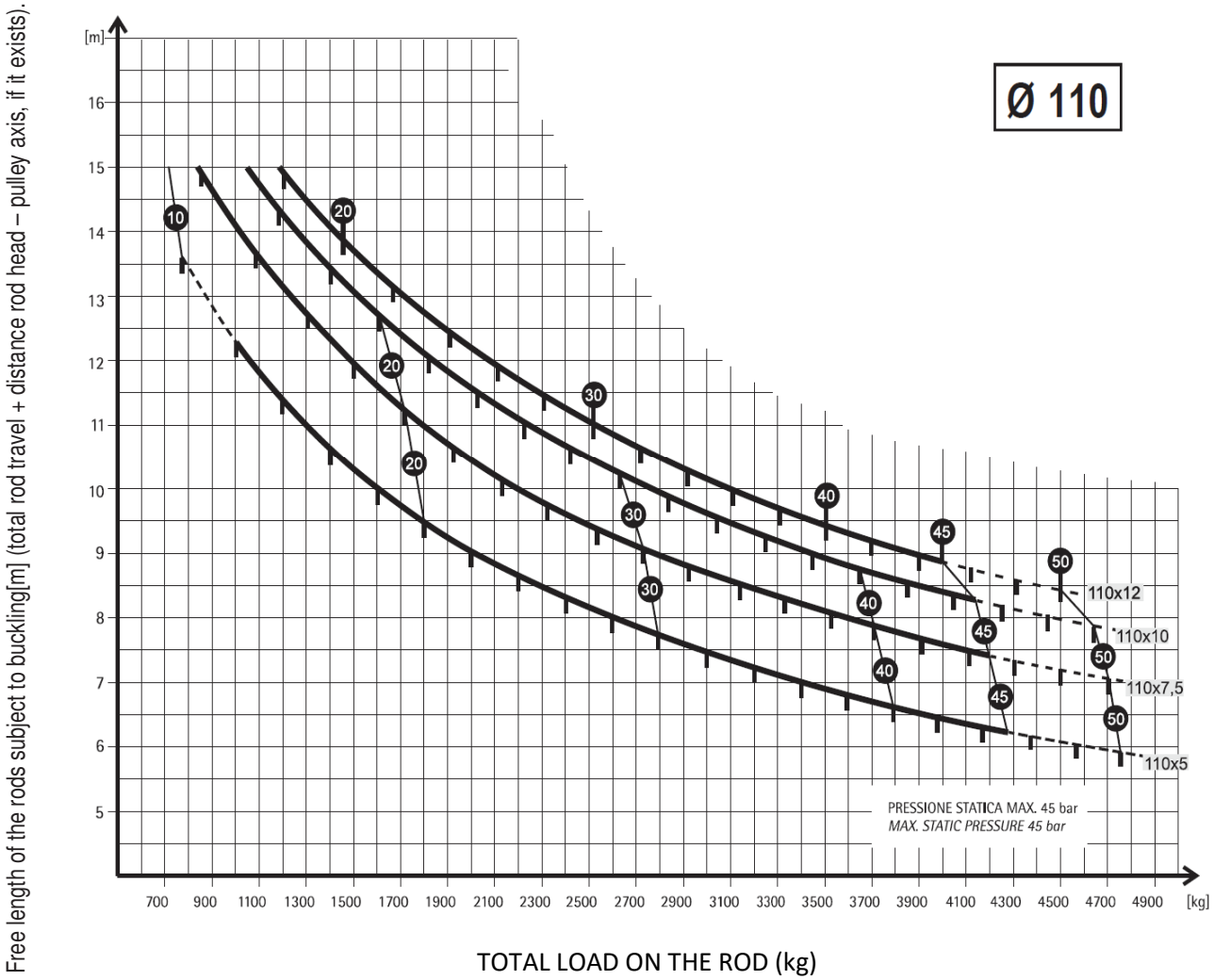

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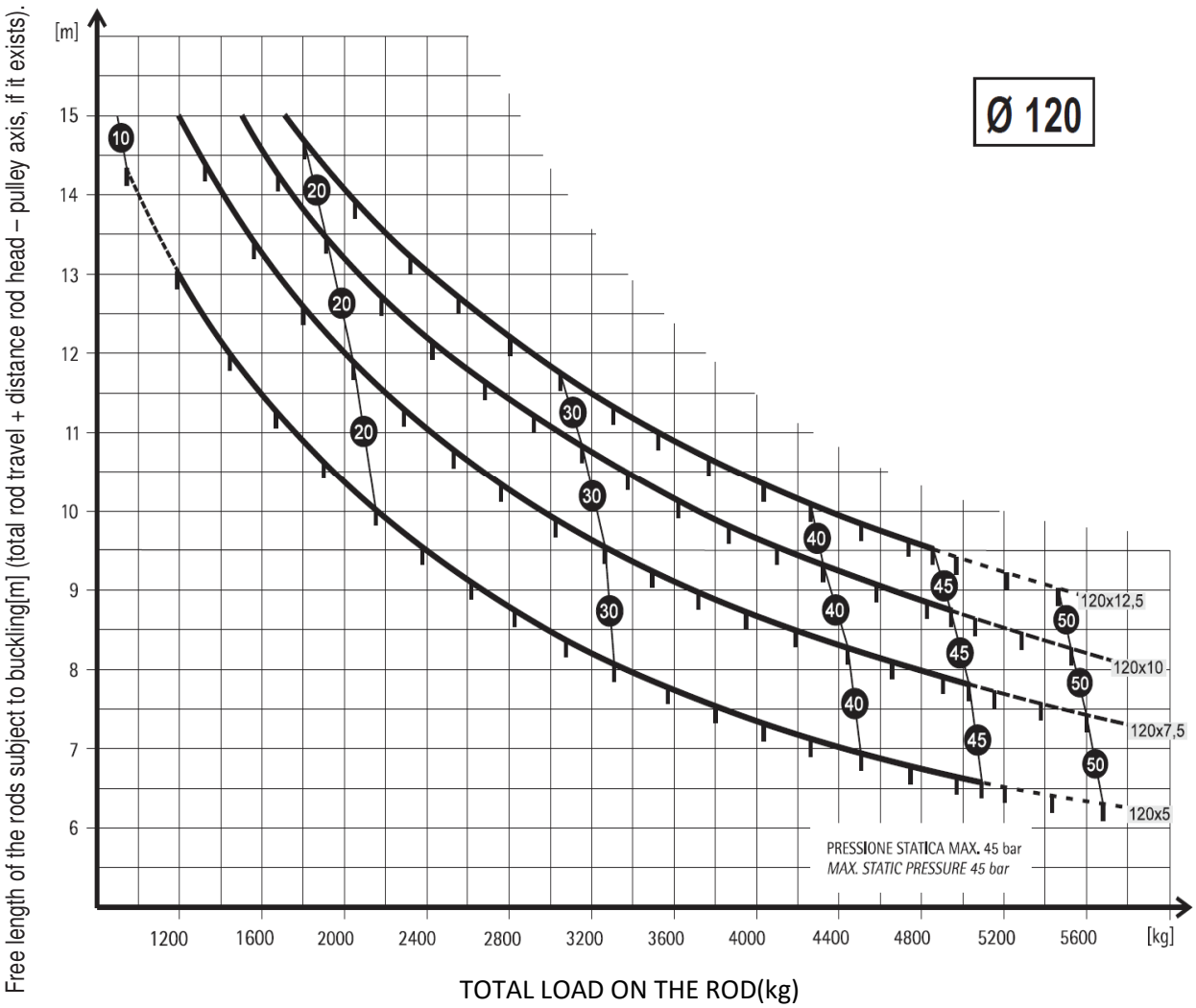
C97 CYLINDER

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



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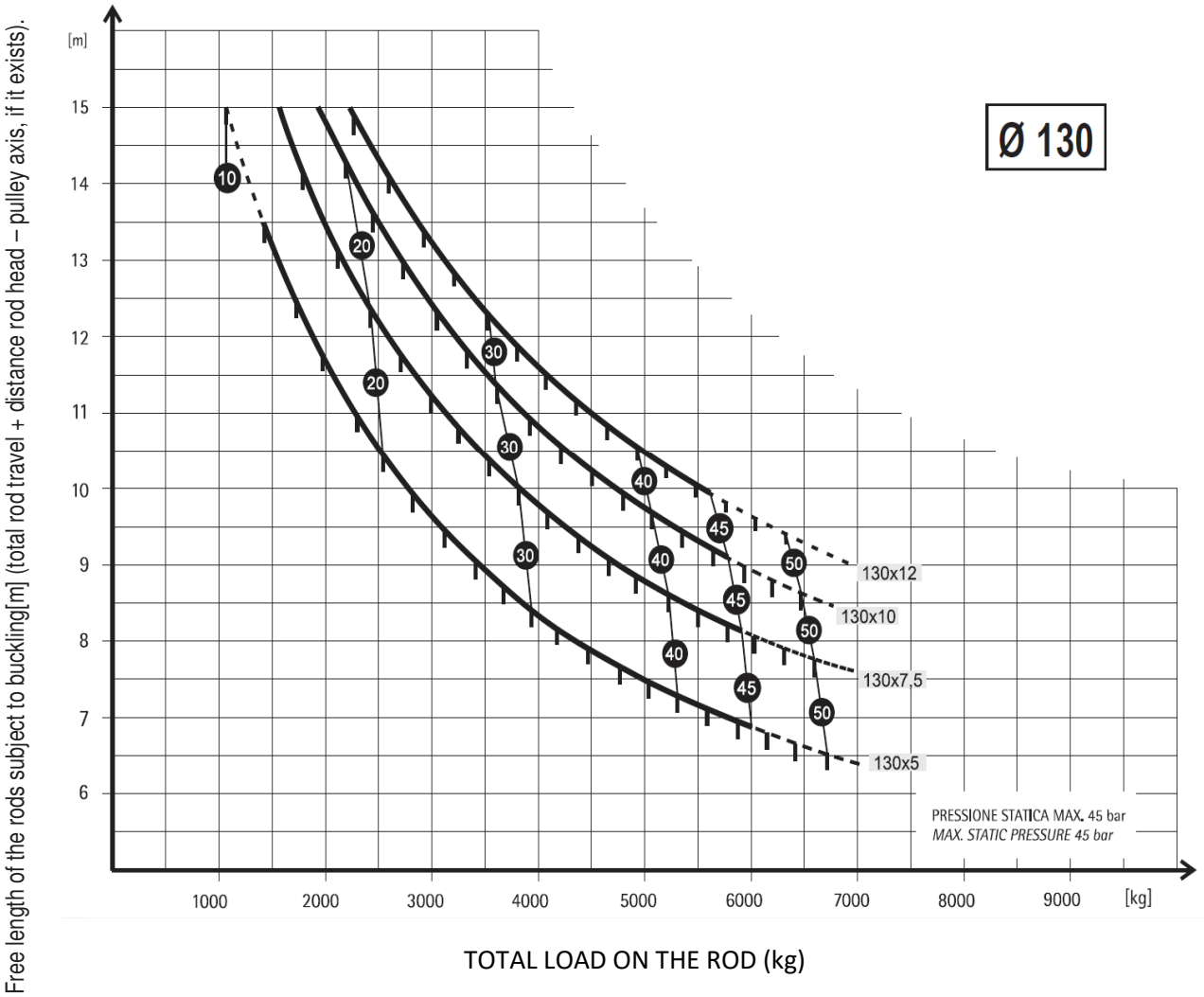
LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



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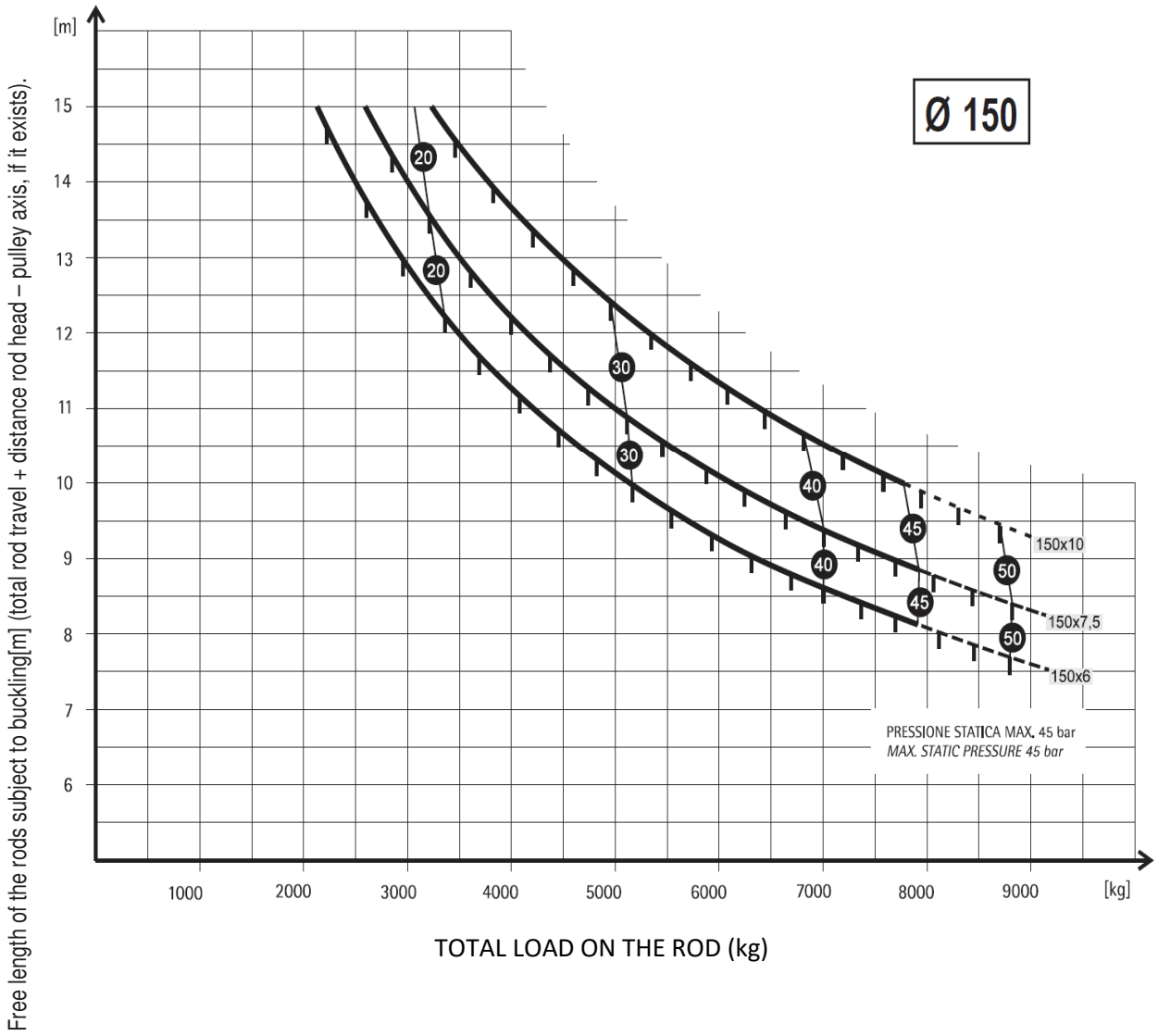
C97 CYLINDER

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



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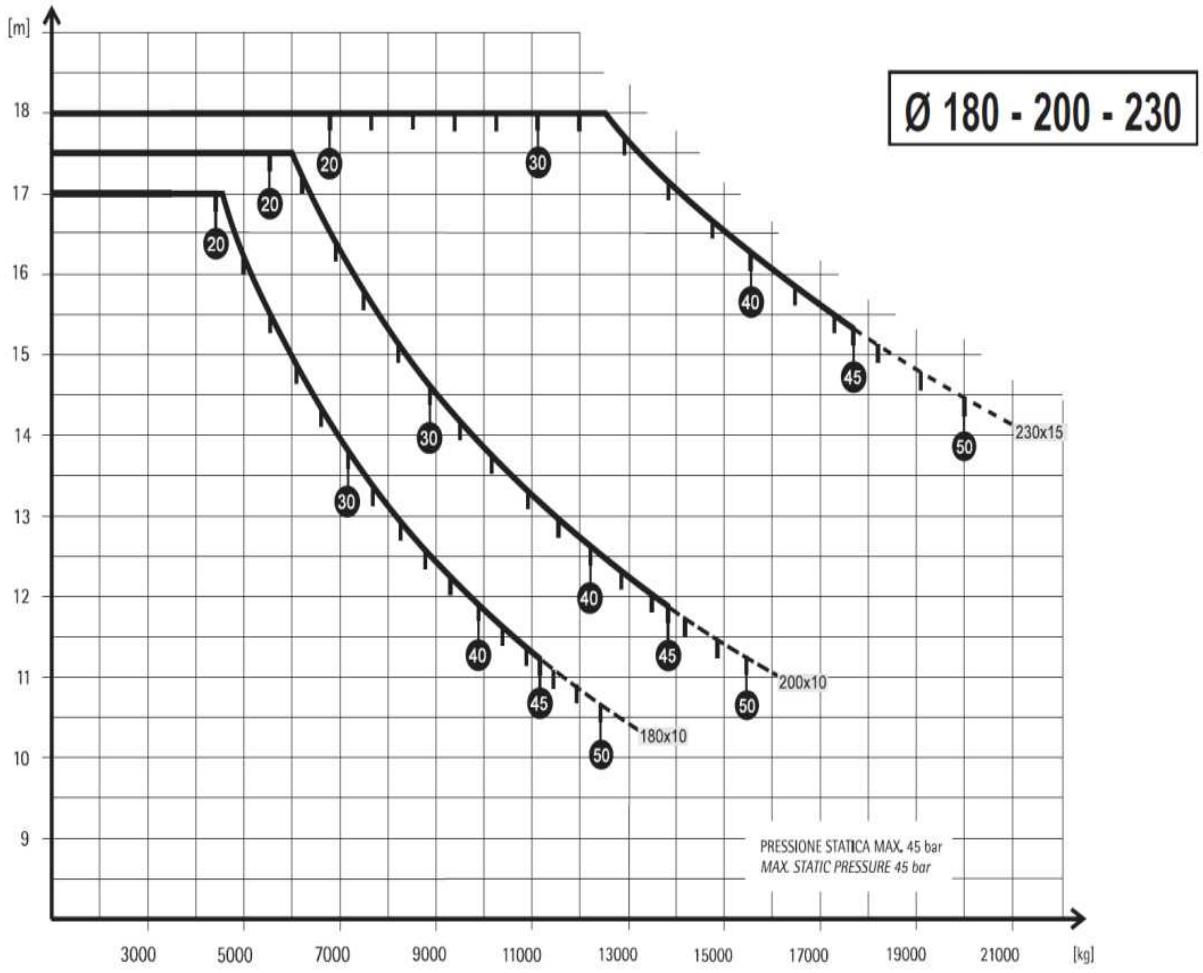
C97 CYLINDER

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



TOTAL LOAD ON THE ROD (kg)

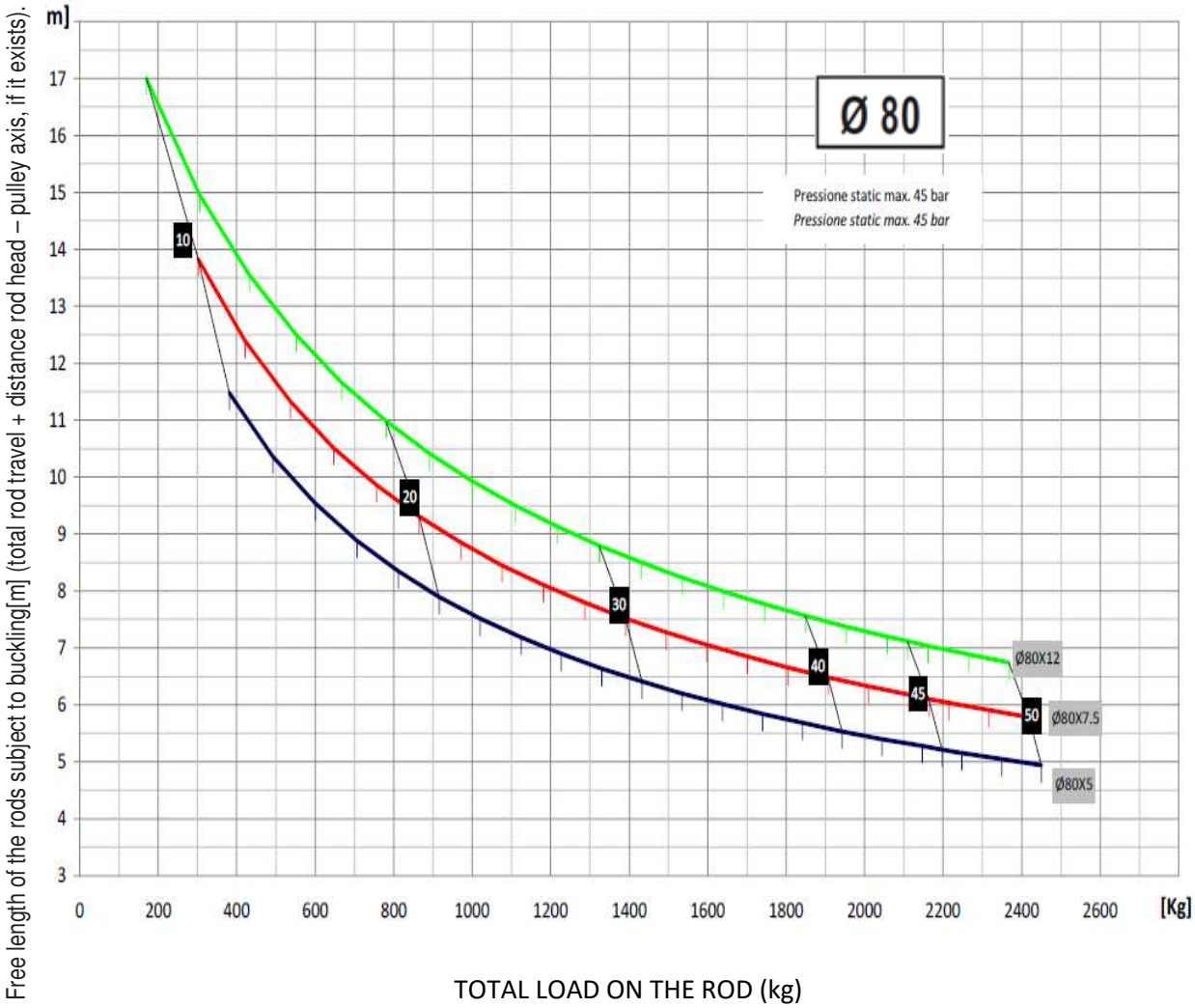
Free length of the rods subject to buckling[m] (total rod travel + distance rod head – pulley axis, if it exists).

⚠ The graphics are indicative only: if in doubt refer to the analytical calculation.

2.4 DIAGRAM OF BUCKLING STRENGHT OF THE ROD: CS CYLINDER

CS CYLINDER

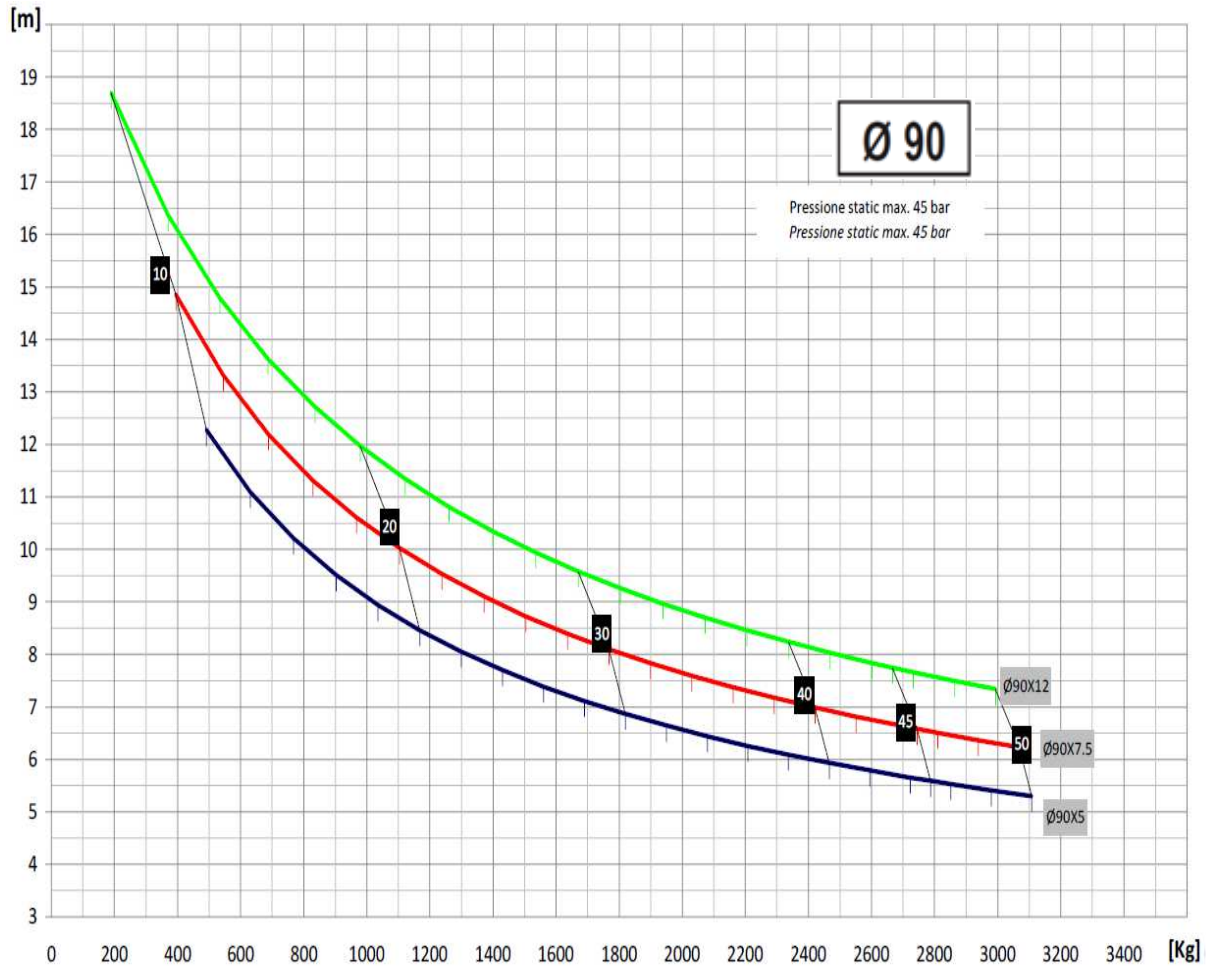
LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



TOTAL LOAD ON THE ROD (kg)

⚠ The graphics are indicative only: if in doubt refer to the analytical calculation.

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



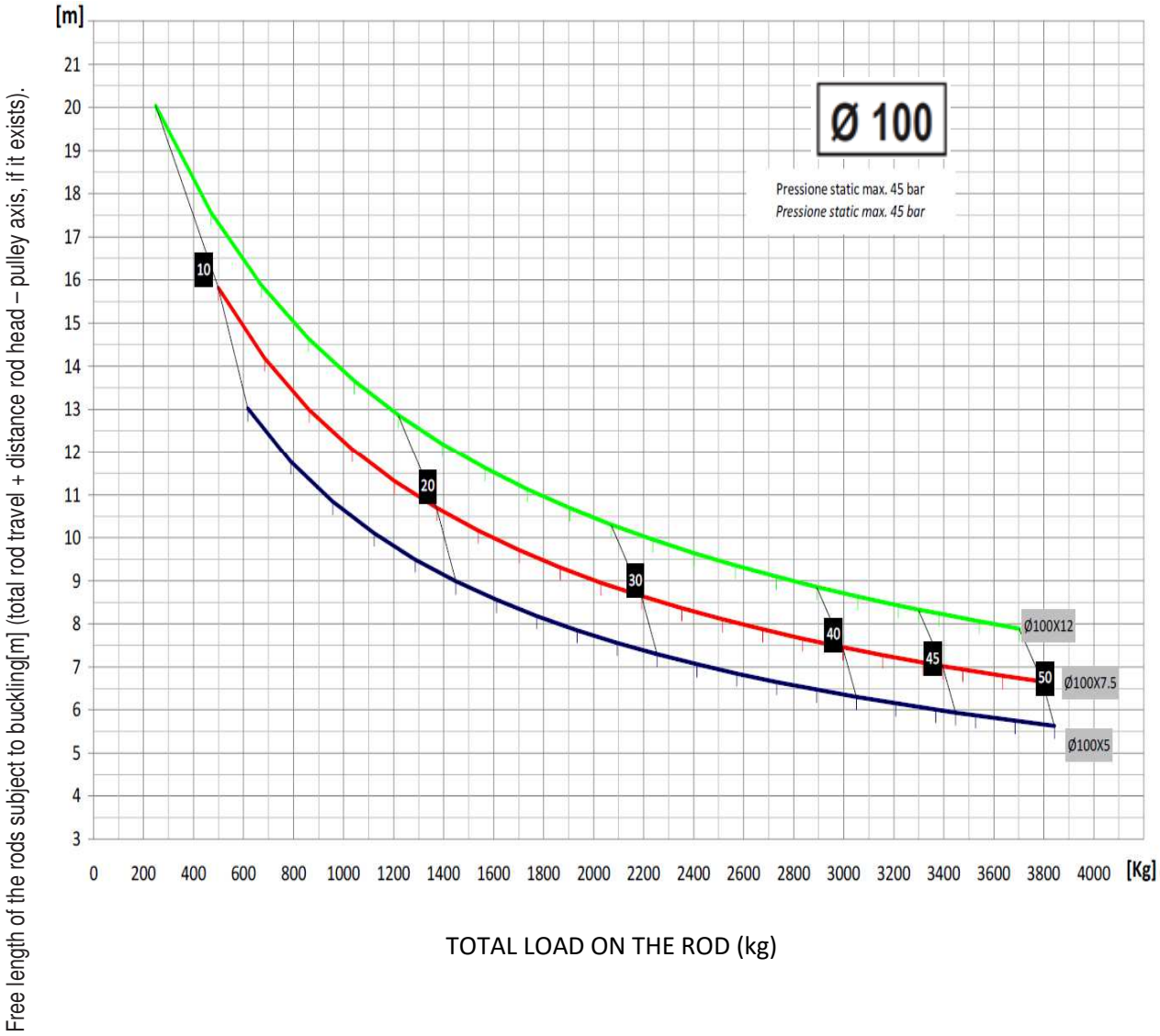
TOTAL LOAD ON THE ROD (kg)

Free length of the rods subject to buckling[m] (total rod travel + distance rod head – pulley axis, if it exists).

⚠ The graphics are indicative only: if in doubt refer to the analytical calculation.

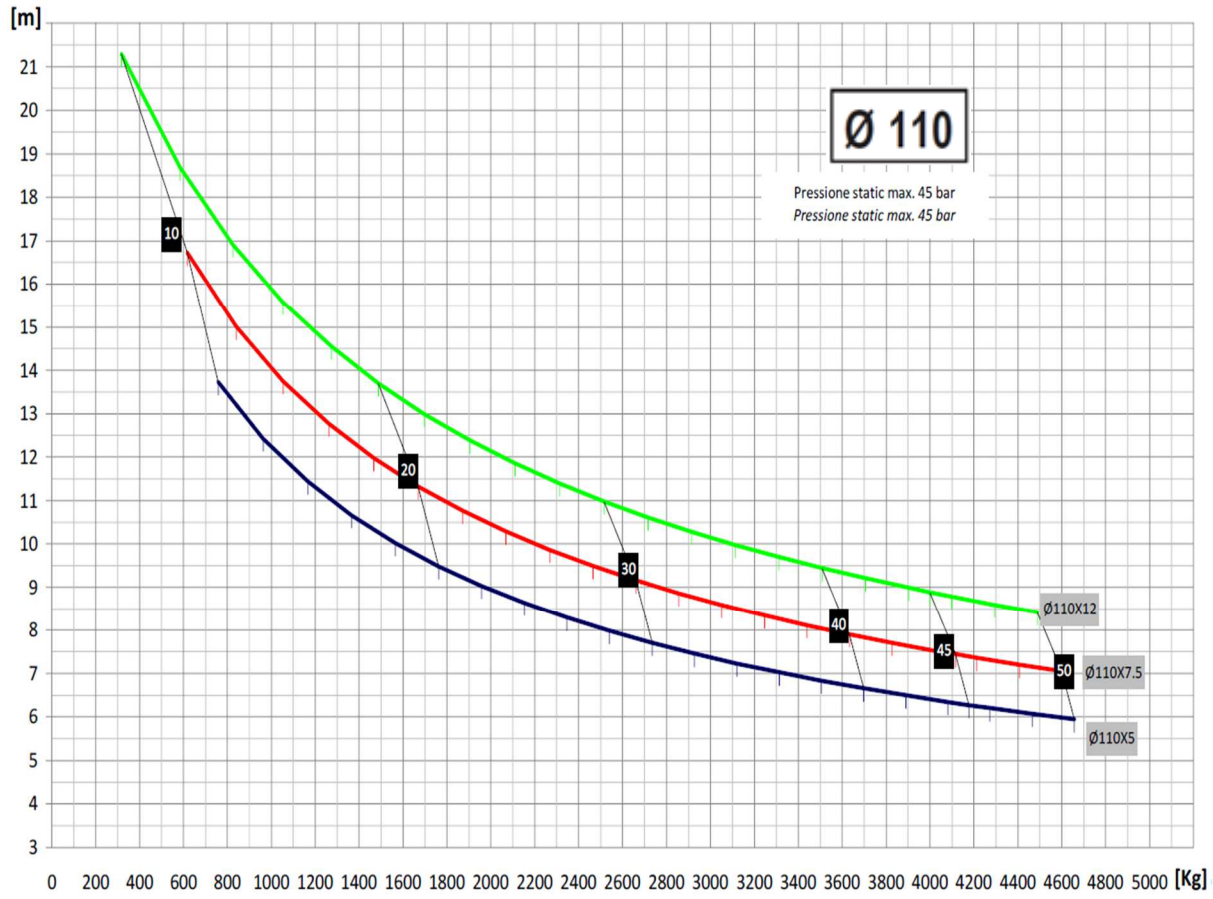
CS CYLINDER

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



⚠ The graphics are indicative only: if in doubt refer to the analytical calculation.

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



Free length of the rods subject to buckling[m] (total rod travel + distance rod head – pulley axis, if it exists).

TOTAL LOAD ON THE ROD (kg)

⚠ The graphics are indicative only: if in doubt refer to the analytical calculation.

ROD DIAMETER (mm)	NL 210 - 1 1/4"																			NL 210 - 1 1/2"										NL 380 - 1 1/2"										NL 380 - 2"					NL 600 - 2"										VALVE SIZE
	55			75			100				125					150					180				210				250				300				380				500					600					PUMP (l/min)
	4,5	6,5	8,0	6,5	8	10,5	6,5	8	10,5	13	8	11	13,0	15,0	17	10,5	13	15	17	20	15	17	20	25	15	17	20	25	30	20	25	30	40	20	25	30	40	25	30	40	50	30	40	50	60	70	40	50	60	70	80	HP MOTOR
	3,3	4,8	5,9	4,8	5,9	7,7	4,8	5,9	7,7	9,6	5,9	7,7	9,6	11,0	12,5	7,7	9,6	11,0	12,5	14,7	11,0	12,5	14,7	18,4	11,0	12,5	14,7	18,4	22,1	14,7	18,4	22,1	29,4	14,7	18,4	22,1	29,4	18,4	22,1	29,4	36,8	22,1	29,4	36,8	44,1	51,5	29,4	36,8	44,1	51,5	58,8	KW MOTOR
	25	38	45	27	37	45	19	27	37	45	18	29	35	42	45	24	31	36	40	45	29	33	38	45	23	27	32	40	45	27	34	40	45	22	28	34	45	21	26	37	45	18	26	34	41	45	18	25	32	38	45	Max. Static pressure
50	0,44			0,61			0,81																																														ROD SPEED (m/s) 2-POLES MOTOR 2750 rpm
60	0,31			0,42			0,56				0,70					0,84																																				
70	0,23			0,31			0,41				0,51					0,62					0,74				0,86																												
80	0,17			0,24			0,32				0,39					0,47					0,57				0,66				0,79																								
85	0,15			0,21			0,28				0,35					0,42					0,50				0,59				0,70				0,84																				
90	0,14			0,19			0,25				0,31					0,37					0,45				0,52				0,62				0,75																				
100	0,11			0,15			0,20				0,25					0,30					0,36				0,42				0,50				0,61				0,77																
110	0,09			0,13			0,17				0,21					0,25					0,30				0,35				0,42				0,50				0,63				0,83										
120	0,08			0,11			0,14				0,18					0,21					0,25				0,29				0,35				0,42				0,53				0,70					0,84					
130	0,07			0,09			0,12				0,15					0,18					0,21				0,25				0,30				0,36				0,45				0,60					0,72					
150				0,07			0,09				0,11					0,13					0,16				0,19				0,22				0,27				0,34				0,45					0,54					
180							0,06				0,08					0,09					0,11				0,13				0,16				0,19				0,24				0,31					0,37					
200											0,06					0,08					0,09				0,11				0,13				0,15				0,19				0,25					0,30					**50 Hz.**
230																0,06					0,07				0,08				0,10				0,11				0,14				0,19					0,23					

⚠ Considering the variability of the characteristics of the installation, the operational condition (pressure and temperature), and the construction tolerance for motors and pumps, the speed may be different from the values provided up to 15%.

ROD DIAMETER (mm)	NL 210 - 1 1/4"															NL 210 - 1 1/2"										NL 380 - 1 1/2"										NL 380 - 2"				NL 600 - 2"										VALVE SIZE
	65			90				120				150					180					215					250					300					360				455				600					PUMP (l/min)
	6,5	8	10,5	6,5	8	10,5	13	8	10,5	13	15	10,5	13	15	17	20	13	15	17	20	25	15	17	20	25	30	17	20	25	30	40	20	25	30	40	25	30	40	50	30	40	50	60	40	50	60	70	80	HP MOTOR
	4,8	5,9	7,7	4,8	5,9	7,7	9,6	5,9	7,8	9,6	11	7,7	9,6	11,0	12,5	14,7	9,6	11,0	12,5	14,7	18,4	11,0	12,5	14,7	18,4	22,1	12,5	14,7	18,4	22,1	29,4	14,7	18,4	22,1	29,4	18,4	22,1	29,4	36,8	22,1	29,4	36,8	44,1	29,4	36,8	44,1	51,5	58,8	KW MOTOR
	25	38	45	19	27	37	45	20	27	36	46	22	28	32	39	45	22	27	31	35	45	21	26	30	37	45	19	24	32	38	45	20	25	32	45	20	26	35	45	20	28	35	45	17	24	30	36	45	Max. static press. (bar)
50	0,52			0,73				0,97																																									
60	0,36			0,50				0,67				0,84																																					
70	0,27			0,37				0,49				0,62					0,74					0,89																												
80	0,20			0,28				0,38				0,47					0,57					0,68					0,79																							
85	0,18			0,25				0,34				0,42					0,50					0,60					0,70					0,84																		ROD SPEED (m/s)
90	0,16			0,22				0,30				0,37					0,45					0,54					0,62					0,75																		
100	0,13			0,18				0,24				0,30					0,36					0,43					0,50					0,61					0,73												POLE MOTOR 3300 rpmin
110	0,11			0,15				0,20				0,25					0,30					0,36					0,42					0,50					0,60				0,76									
120	0,09			0,13				0,17				0,21					0,25					0,30					0,35					0,42					0,50				0,64				0,84					
130	0,08			0,11				0,14				0,18					0,21					0,26					0,30					0,36					0,43				0,54				0,72					
150				0,08				0,11				0,13					0,16					0,19					0,22					0,27					0,32				0,41				0,54					
180								0,07				0,09					0,11					0,13					0,16					0,19					0,22				0,28				0,37					
200												0,08					0,09					0,11					0,13					0,15					0,18				0,23				0,30					**60 Hz.**
230																	0,07					0,08					0,10					0,11					0,14				0,17				0,23					

⚠ Considering the variability of the characteristics of the installation, the operational condition (pressure and temperature), and the construction tolerance for motors and pumps, the speed may be different from the values provided up to 15%.

TANK TYPE			50/S	110/S	135/S	210/S	320/S	450	680	TANK TYPE
PUMP			MAX 35 l/min	MAX 150 l/min		MAX 210 l/min	MAX 300 l/min	MAX 380 l/min	MAX 600 l/min	PUMP
OUTLET			1/2" & 3/4"	3/4" & 1" 1/4"	1"1/4	1"1/4 & 1"1/2	1"1/4 & 1"1/2	1" 1/2 & 2"	2"	OUTLET
ROD DIAMETER (mm)	OIL NECESSARY		20	35	35	50	90	155	210	Oil for Motor Coverage (l)
	Movement (l/metro)	Filling (l/metro)	23	65	100	140	220	310	490	Oil for Movement (l)
50	2	3,1	5250/11500	8000	8000					Max. ROD Stroke (mm)
60	3	4,5	4100/7600	9000	9000	9000				
70	3,8	5	3000/6000	7250/11000	11000	11000				
80	5	3,8	3000/4600	7250/13000	11000/16000	11000/18000				
85	5,7	4,7		6250/11500	9650/15500	11250/16500	13750/19000			
90	6,4	5,7		5250/10000	8250/15000	11500/15000	14000/20000			
100	7,8	5,6		4750/8000	7250/12500	10500/15000	15000/18000	14000/22000		
110	9,5	6,4		4000/6500	6250/10000	8750/14000	13500/17000	15000/22000		
120	11,3	6,1		3750/5500	5500/8500	8000/10500	12250/16000	17000/22000		
130	13,3	8,5		3000/4500	4500/7000	6500/10000	9750/15000	13750/22000	19000/34000	
150	17,7	8,3		2500/3500	3600/5500	5250/7500	8250/12000	11750/16500	18000/26000	
180	25,4	15,6				3400/5500	5250/8000	7250/11500	11500/18500	
200	31,4	18,9					4250/6500	6000/9000	9500/14000	
230	41,5	19,4						5000/7000	8750/11000	

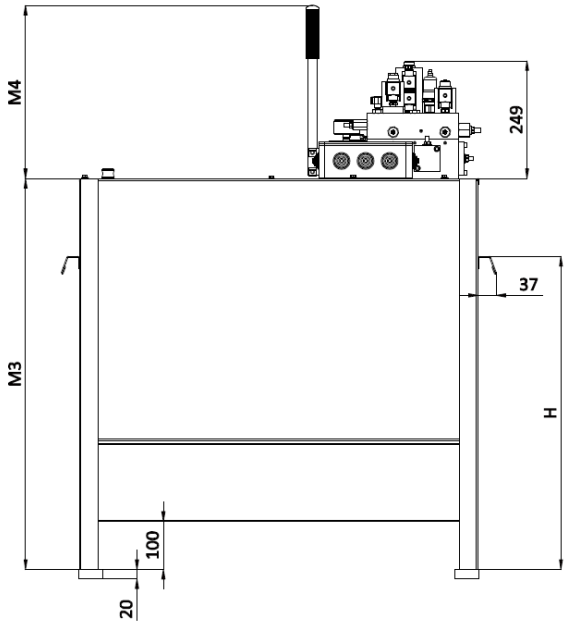
DATA ONLY FOR COMMERCIAL AIM

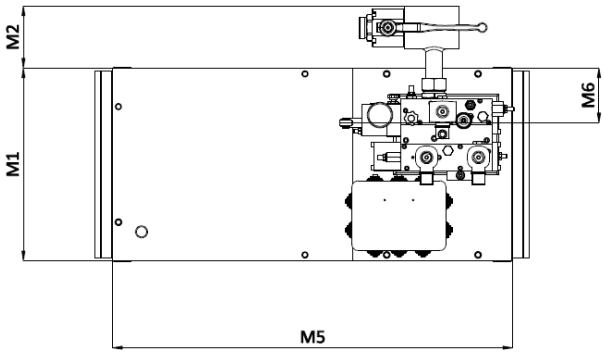
Example 5250/11500

5250: with the tank full, the maximum rod travel that can be performed.

11500: the maximum rod travel with the oil filling up.

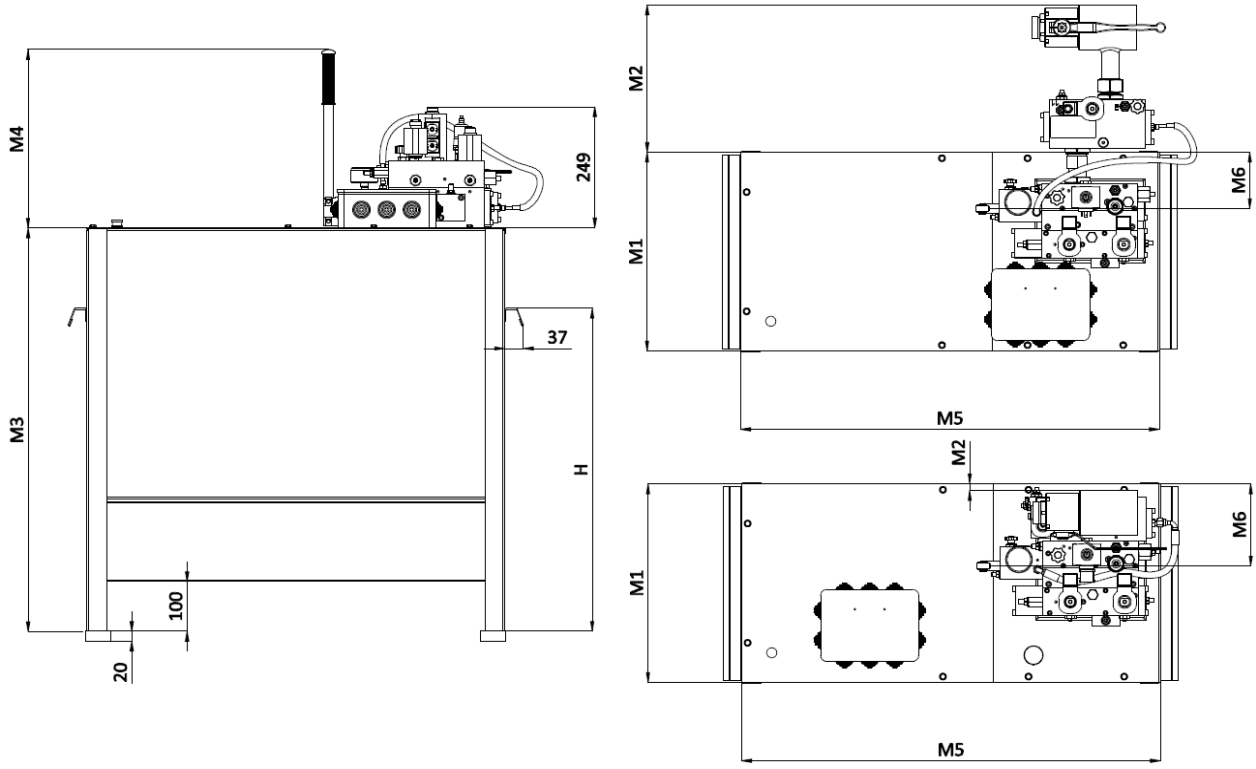
2.8 PUMP UNITS DIMENSIONS





VALVE TYPE	TANK TYPE	USEFUL CAPACITY *litres*	ENCUBRANCE DIMENSIONS [mm]							
			M1	M2 HORIZ FILTER.	M2 VERT. FILTER	M3	M4	M5	M6	H
NL - 210	110/S	65	300	95	0	702	360	700	140	640
	135/S	100	300	95	0	902	360	700	155	640
	210/S	140	400	129	51	810	360	830	110	650
	320/S	220	460	160	70	950	360	950	110	650
	450	310	700	150	-	952	360	1000	105	650
NL - 380	320/S	220	460	160	70	950	360	950	125	650
	450	310	700	150	-	952	360	1000	130	650
	680	490	800	140	-	1002	360	1250	165	650
NL - 600	680	490	800	140	-	1002	360	1250	165	650
	900	690	800	140	-	1202	360	1250	165	650
	1000	790	800	140	-	1302	360	1250	165	650

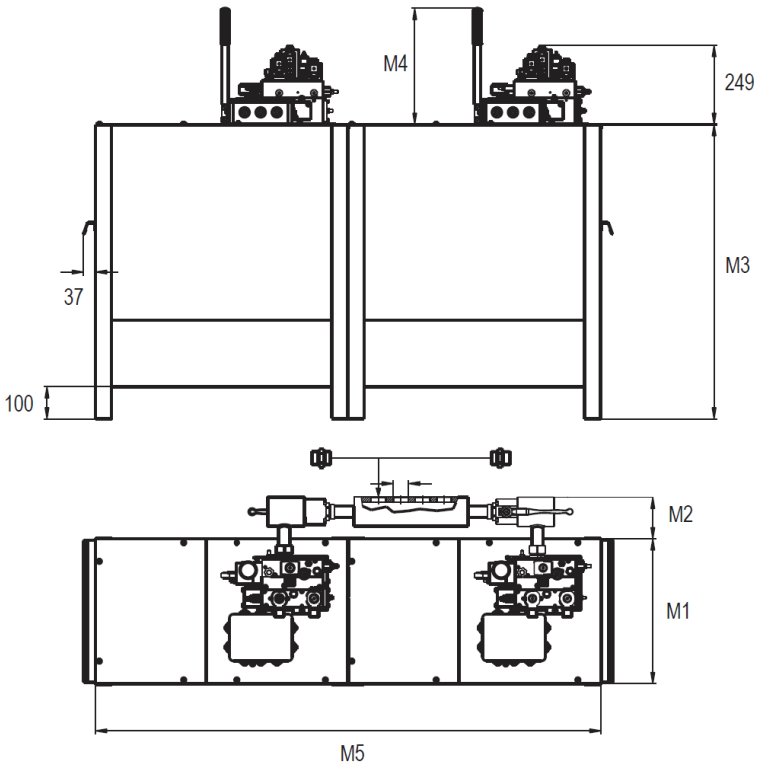
2.9 PUMP UNITS DIMENSIONS WITH HDU (UCM DEVICE)



NL + HDU INTEGRATED

VALVE TYPE	TANK TYPE	USEFUL CAPACITY *litres*	ENCUBRANCE DIMENSIONS [mm]							
			M1	M2 HORIZ FILTER.	M2 VERT. FILTER	M3	M4	M5	M6	H
NL – 210 + HDU INTEGRATED	110/S	65	300	-	0	702	360	700	162	640
	135/S	100	300	-	0	902	360	700	162	640
	210/S	140	400	-	0	810	360	830	165	650
	320/S	220	460	-	0	950	360	950	320	650
	450	310	700	-	0	952	360	1000	310	650
NL – 210 + HDU STAND ALONE	110/S	65	300	230	150	702	360	700	161	640
	135/S	100	300	230	150	902	360	700	161	640
	210/S	140	400	305	80	810	360	830	114	650
	320/S	220	460	100	15	950	360	950	320	650
	450	310	700	130	40	952	360	1000	310	650
NL – 380 + HDU STAND ALONE	320/S	220	460	175	85	950	360	950	295	650
	450	310	700	210	95	952	360	1000	285	650
	680	490	800	170	-	1002	360	1250	357	650
NL – 600 + HDU STAND ALONE	680	490	800	180	-	1002	360	1250	478	650
	900	690	800	180	-	1202	360	1250	478	650
	1000	790	800	180	-	1302	360	1250	478	650

2.10 OVERALL DIMENSION OF PUMP UNITS WITH DOUBLE TANK



VALVE TYPE	TANK TYPE	ENCUMBRANCE DIMENSIONS [mm]					
		M1	M2 WITHOUT HDU HORIZ FILTER.	M2 HDU	M3	M4	M5
NL – 210 (HDU INTEGRATED)	110/S	300	95	0	702	360	1400
	135/S	300	95	0	902	360	1400
	210/S	400	129	0	810	360	1660
	320/S	460	160	0	950	360	1900
	450	700	150	0	952	360	2000
NL – 380 (HDU STAND ALONE)	320/S	460	160	175	950	360	1900
	450	700	150	210	952	360	2000
	680	800	140	170	1002	360	2500
NL – 600 (HDU STAND ALONE)	680	800	150	180	1002	360	2500
	900	800	150	180	1202	360	2500
	1000	800	150	180	1302	360	2500

2.11 SAFETY VALVES

2.11.1 RUPTURE VALVES (VP)

Safety valves in case of pipes rupture. Available in many sizes. (3/4", 1" ¼, 1" ½, 2")

- Certified TÜV SUD according to the Normative EN81-2 and EN81-20/50

VALVE MODEL	RANGE TEMP	OIL VISCOSITY	PRESSURE	FLOW RATE l/min
VP HC 34	0-65 °C	25-400 cSt	10-80 bar	**5-55**
	0-65 °C	25-400 cSt	10-80 bar	**5-55**
VP 114	0-65 °C	25-400 cSt	10-80 bar	**35-150**
	0-65 °C	25-400 cSt	10-80 bar	**35-150**
VP 112	0-65 °C	25-400 cSt	10-80 bar	**70-300**
	0-65 °C	25-400 cSt	10-80 bar	**70-300**
VP 200	0-65 °C	25-400 cSt	10-60 bar	**150-600**
	0-65 °C	25-400 cSt	10-60 bar	**150-600**

2.11.2 UCM PREVENTIONS VALVES (HDU)

Device against unintended car movement, available in configuration INTEGRATED and STAND ALONE, also for non OMARLIFT power units.

Certified TÜV SUD according to the Normative EN81-2 and EN81-20/50 in braking or redundant configuration.

VALVE MODEL	VERSION	RANGE TEMP	OIL VISCOSITY	PRESS.	FLOW RATE l/min
HDU 35	Integrated	0-65 °C	25-400 cSt	10-50 bar	8-55
	Stand alone	0-65 °C	25-400 cSt	10-50 bar	8-55
HDU 210	Integrated	0-65 °C	25-400 cSt	10-45 bar	55-250
	Stand alone	0-65 °C	25-400 cSt	10-45 bar	55-250
HDU 380	Integrated	-	-	-	-
	Stand alone	0-65 °C	25-400 cSt	10-45 bar	250-450
HDU 600	Integrated	-	-	-	-
	Stand alone	0-65 °C	25-400 cSt	10-45 bar	450-600

2.12 MRL PUMP UNITS

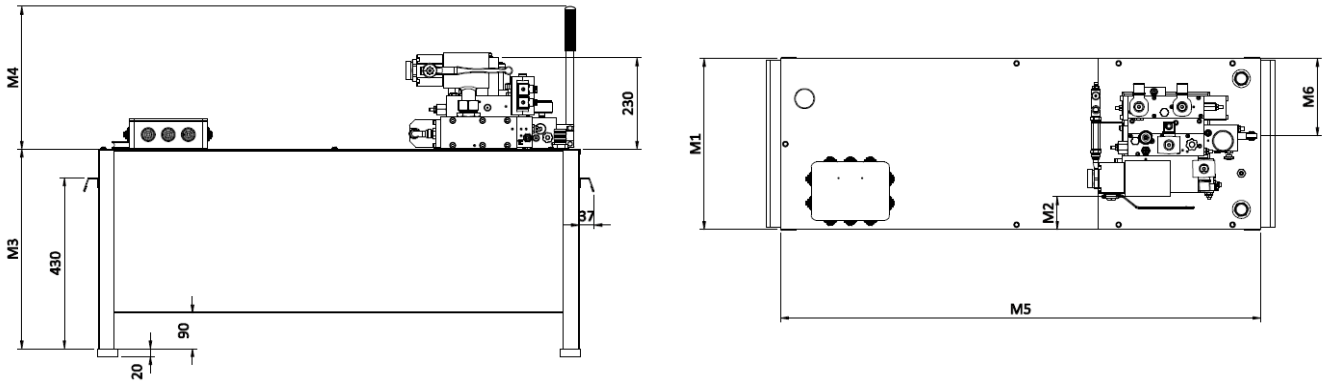
Machine Room Less (MRL) pump units are engineered for installations without a dedicated machine room.

2.12.1 APPLICATIONS IN PIT (horizontal)

Pump units, with reduced height while ensuring a discrete amount of oil, designed for placement at the bottom of the pit and available in different configurations with HC, HI or NL valve, with or without UCM device (HDU).

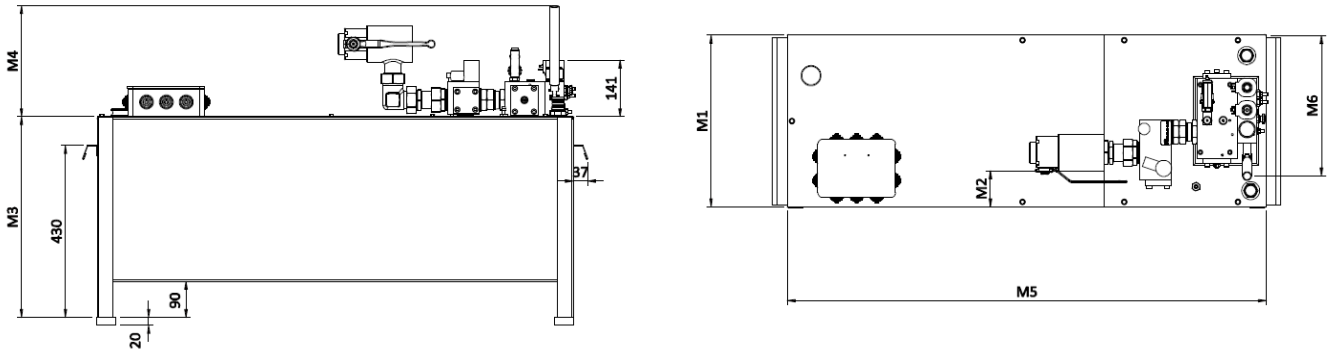
- **NL valve with HDU**

VALVE TYPE	USABLE OIL	M1	M3	M4	M5	M6
NL	77	430	500	360	1200	190



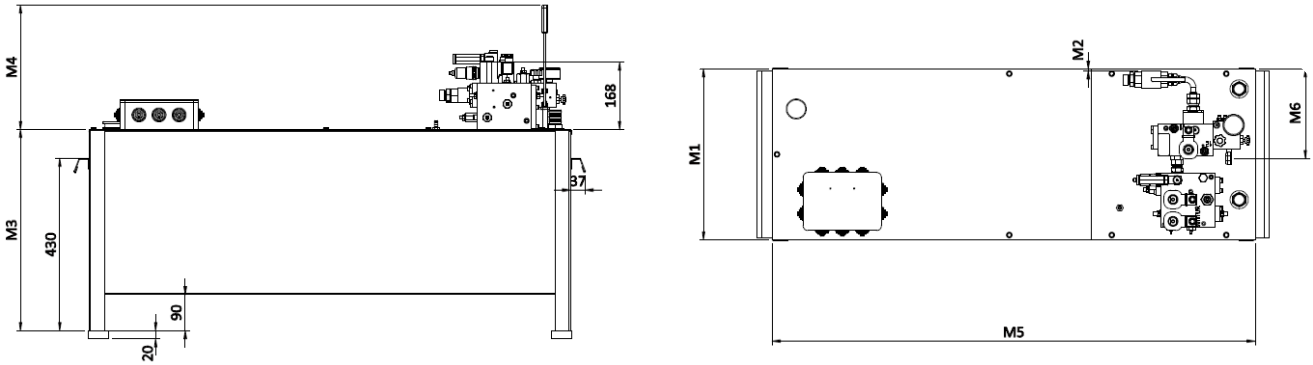
- **HI valve with HDU**

VALVE TYPE	USABLE OIL	M1	M3	M4	M5	M6
HI	77	430	500	360	1200	190



- **HC valve with HDU**

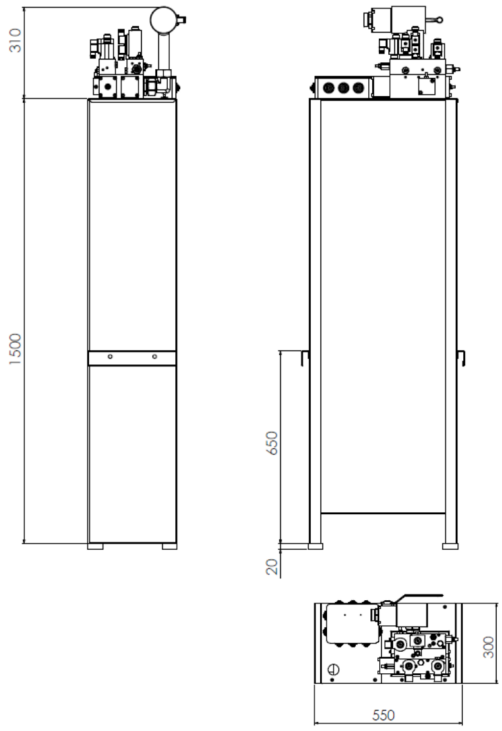
VALVE TYPE	USABLE OIL	M1	M3	M4	M5	M6
HC	77	430	500	360	1200	190



2.12.2 APPLICATIONS IN SHAFT (vertical)

Compact power units with possibility of installations in pit between guides, with a discrete amount of oil for movement.

PUMP UNIT DIMENSION

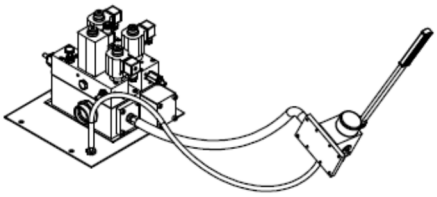


Maximum Rod Stroke - Oil necessary - Hose Connection

TIPO SERBATOIO / *TANK TYPE*			MRL	TIPO SERBATOIO / *TANK TYPE*
POMPA / *PUMP*			MAX 210 l/min	POMPA / *PUMP*
USCITA / *OUTLET*			1"1/4 1"1/2	USCITA / *OUTLET*
STELO (mm)	OLIO NECESSARIO *OIL NECESSARY*		130	Olio per Copertura Motore (l) Oil for *Motor Coverage (l)*
ROD DIAMETER (mm)	Movimento *Movement (l/metro)*	Riempimento *Filling (l/metro)*	80	Olio per Movimento (l) Oil for *Movement (l)*
50	2	3.1	8000	Corsa max STELO (mm) *Max ROD Stroke (mm)*
60	3	4.5	10000	
70	3.8	5	9000/11000	
80	5	3.8	9000(11000*)/12000	
85	5.7	4.7	7500/13000	
90	6.4	5.7	6500(8500*)/12500	
100	7.8	5.6	6000(7000*)/10000	
110	9.5	6.4	5000(6000*)/8250	
120	11.3	6.1	4500/7000	
130	13.3	8.5	3500/6000	
150	17.7	8.3	3000/4500	

* Cilindro tipo CS - *CS Cylinder type*

Hand pump mounted outside the pit, completed of tubes and fittings



MOTOR - PUMP CHOICE 50 Hz

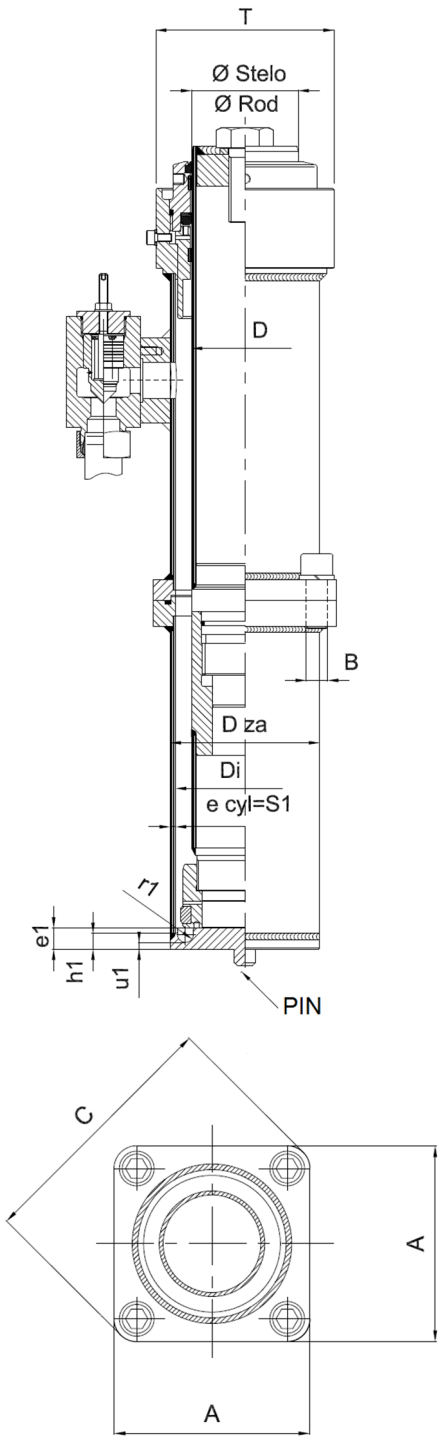
ROD DIAMETER (mm) DIAMETRO STELO (mm)	NL210 - 1 1/4"																			NL210 - 1 1/2"								VALVOLA VALVE SIZE
	55			75			100				125				150					180				210				POMPA (l/min) PUMP (l/min)
	4.5	6.5	8	6.5	8	10.5	6.5	8	10.5	13	8	10.5	13	15	10.5	13	15	17	20	15	17	20	25	15	17	20	25	MOTORE (HP)
	3.3	4.7	5.8	4.7	5.8	7.7	4.7	5.8	7.7	9.5	5.8	7.7	9.5	11	7.7	9.5	11	12.5	14.7	11	12.5	14.7	18.3	11	12.5	14.7	18.3	MOTORE (kW)
	25	38	45	27	37	45	19	27	37	45	22	29	36	45	24	31	36	40	45	29	33	38	45	23	27	32	40	Press. Statica Max. (bar) Max. Static Pressure (bar)
50	0.45			0.61			0.81																					
60	0.31			0.43			0.58				0.71				0.85													
70	0.23			0.32			0.43				0.53				0.62					0.75				0.86				VELOCITA' STELO (m/s) MOTORI 2 poli 2750g/min
80	0.18			0.25			0.32				0.41				0.48					0.58				0.68				
85	0.16			0.22			0.28				0.37				0.43					0.52				0.61				ROD SPEED (m/s) 2 POLE MOTOR 2750 rpmin
90	0.14			0.19			0.26				0.32				0.38					0.46				0.54				
100	0.12			0.16			0.21				0.26				0.31					0.37				0.44				
110	0.10			0.13			0.18				0.22				0.26					0.31				0.36				
120	0.08			0.11			0.15				0.19				0.22					0.26				0.31				
130	0.07			0.10			0.13				0.16				0.19					0.22				0.26				**50 Hz.**
150				0.07			0.10				0.12				0.14					0.17				0.20				

MOTOR - PUMP CHOICE 60 Hz

ROD DIAMETER (mm) DIAMETRO STELO (mm)	NL210 - 1 1/4"																	NL210 - 1 1/2"								VALVOLA VALVE SIZE
	65			90				120				150						180				215				POMPA (l/min) PUMP (l/min)
	6	8	10.5	6	8	10.5	13	8	10.5	13	15	10.5	13	15	17	20		15	17	20	25	15	17	20	25	MOTORE (HP)
	4.4	5.8	7.7	4.4	5.8	7.7	9.5	5.8	7.7	9.5	11	7.7	9.5	11	12.5	14.7		11	12.5	14.7	18.3	11	12.5	14.7	18.3	MOTORE (kW)
	25	38	45	19	27	37	45	20	27	36	45	22	28	32	39	45		22	27	35	45	21	30	37	45	Press. Statica Max. (bar) Max. Static Pressure (bar)
50	0,50			0,70				0,93																			
60	0,35			0,50				0,68				0,84															
70	0,25			0,37				0,50				0,61						0,74				0,88					VELOCITA' STELO (m/s) MOTORI 2 poli 2750g/min
80	0,20			0,28				0,37				0,47						0,57				0,68					
85	0,15			0,21				0,30				0,37						0,45				0,54					ROD SPEED (m/s) 2 POLE MOTOR 2750 rpmin
90	0,13			0,18				0,24				0,30						0,36				0,43					
100	0,10			0,14				0,20				0,25						0,30				0,36					
110	0,08			0,12				0,17				0,21						0,25				0,30					
120	0,07			0,10				0,14				0,18						0,21				0,25					
130				0,07				0,10				0,13						0,16				0,19					**60 Hz.**
150								0,07				0,09						0,11				0,13					

3 OVERALL DIMENSION TABLES, TECHNICAL DATA AND VALVE SCHEMES

3.1 C97 CYLINDERS – BARREL, BOTTOM AND JOINTS DIMENSIONS



	D	Dza	Di	S1	r1	u1	h1	e1	A	KEY SCREW	B	C mm	T mm	FLANGE WEIGHT kg	ROD JOINT WEIGHT kg (MAX)
C97	80	114,3	106,3	4	5	5,5	11	16	140 x 140	14	M16	185	150	5	4
C97	85	114,3	106,3	4	5	5,5	11	16	140 x 140	14	M16	185	150	5	4
C97	90	133	124	4,5	7,5	6,5	15	20	163 x 163	14	M18	215	157	5	6
C97	100	139,7	130,7	4,5	7,5	6,5	15	20	172 x 172	17	M20	228	166	6	7
C97	110	152,4	142,4	5	6,5	7,5	15	20	184 x 184	17	M22	244	175	8	7
C97	120	159	149	5	6,5	7,5	15	20	200 x 200	17	M22	264	200	10	7
C97	130	177,8	166,6	5,6	7	8	16	21	222 x 222	19	M24	293	216	11	12
C97	150	193,7	181,9	5,9	6,2	8,8	16	21	232 x 232	19	M27	307	226	13	14
C97	180	244,5	228,5	8	11,5	12	25	30	282 x 282	24	M33	375	270	17	14
C97	200	273	253	10	9	14,5	25	30	308 x 308	24	M33	412	296	18	24
C97	230	298,5	278,5	10	10	14,5	26	31	350 x 350	27	M36	464	340	20	29

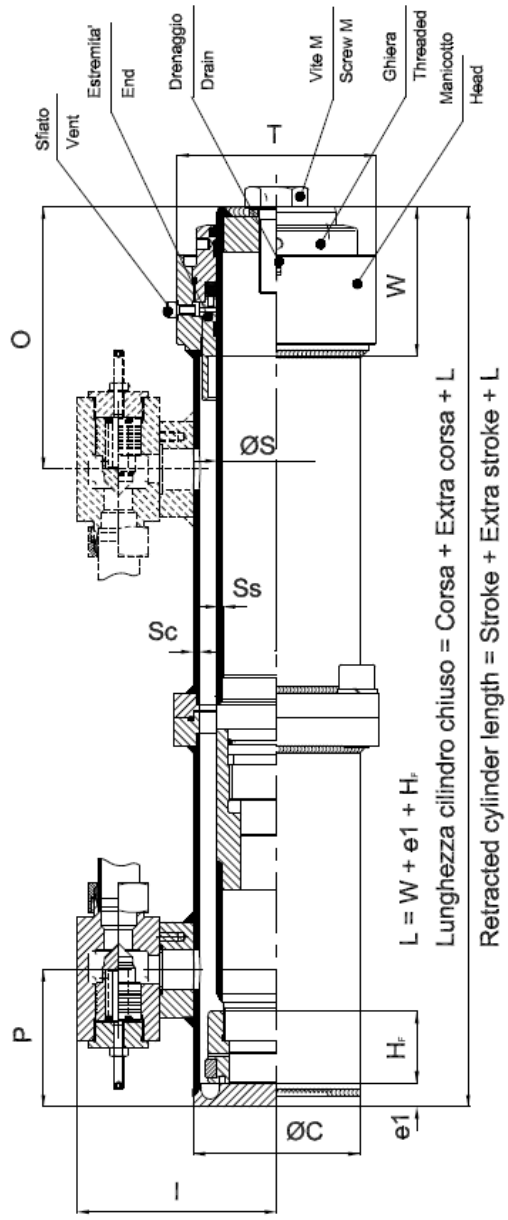
Max. static pressure 45 bar

Centering PIN (optional) Ø20x20 mm

- The weight of a two – piece rod is obtained by summing the one – piece rod weight to the rod joint weight.
- The weight of a two – piece complete cylinder is obtained by summing the one – piece cylinder weight to the rod joint weight and to the two flanges' weight.

3.2 C97 CYLINDERS - INDIRECT SIDE ACTING

Upper cushioned end

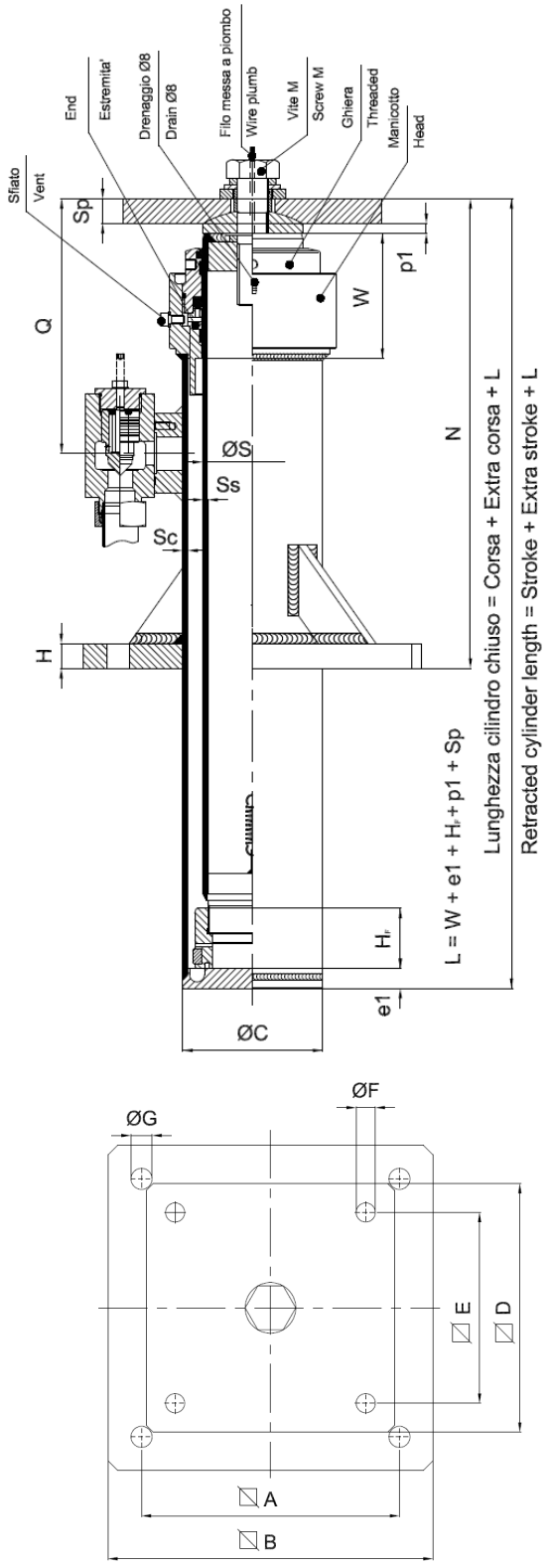


Max. static pressure 45 bar

	ROD			BARREL		HEAD	VALVE			FIXED	SCREW	WEIGHT				OIL l/m	
	ØS	Ss		ØC	Sc	T	I	O	P	L	M	x 1m travel (kg/m)		fixed (kg)		movement x 1m	filling x 1m
C97	80	EN	12	114,3	4	150	157	320	210	205	M18	21 25	25 41	25 41	44	5	3,8
C97	85	5 7,5		114,3	4	150	157	320	210	205	M30	23 27	31	43 45		5,6	3,2
C97	90	5 10	7,5 12	133	4,5	157	166	320	215	205	M30	25 34	30 37	29 31	30 32	6,4	5,7
C97	100	5 10	7,5 12	139,7	4,5	166	170	320	215	205	M30	27 37	32 41	30 32	31 33	7,8	5,6
C97	110	5 10	7,5 12	152,4	5	175	196	325	215	215	M30	32 43	38 48	37 39	31 40	9,5	6,4
C97	120	5 10	7,5 12,5	159	5	200	200	325	215	215	M30	35 46	40 52	42 47	45 48	11,3	6,1
C97	130	5 10	7,5 12	177,8	5,6	216	210	325	215	215	M30	39 53	46 59	53 56	55 57	13,3	8,5
C97	150	6 10	7,5	193,7	5,9	226	217	325	215	215	M30	49 62	54	57 60	58	17,7	8,3
C97	180	10		244,5	8	270	242	355	225	260	M60	89		97		25,4	15,6
C97	200	10		273	10	296	257	355	225	260	M60	112		106		31,4	18,9
C97	230	15		298,5	10	340	270	355	225	260	M60	151		151		41,5	19,4

3.3 C97 CYLINDERS - DIRECT CENTRAL ACTING

Upper cushioned end

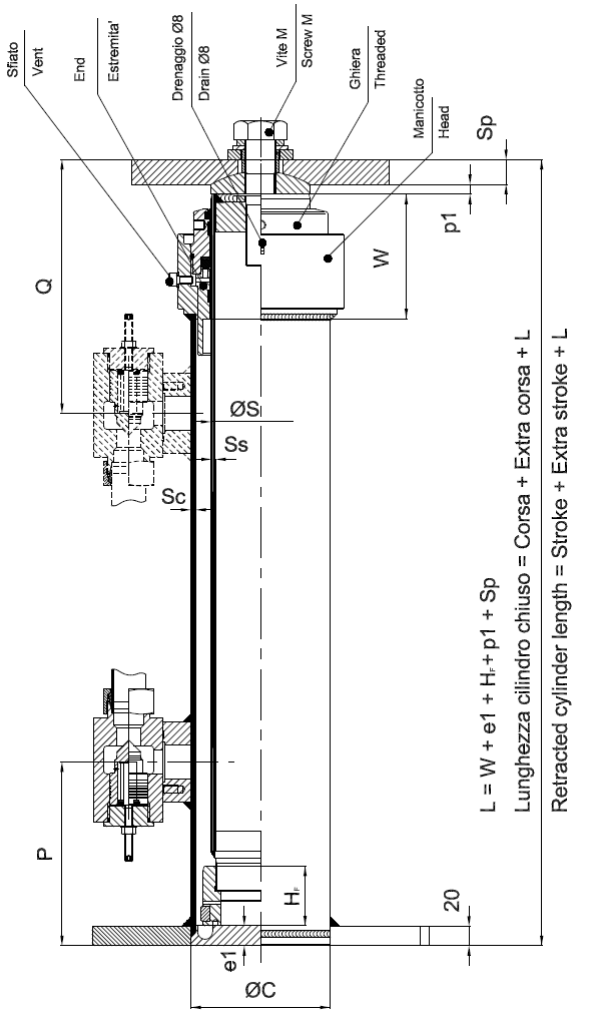


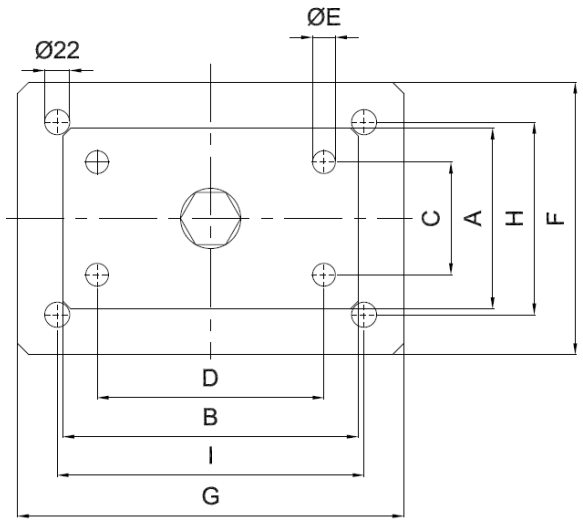
	ROD		BARREL	OSCILLATING PLATE				BASE PLATE						FIXED	SCREW	WEIGHT			OIL l/m	
	ØS	Ss	ØC	Sc	D	E	Sp	F	A	B	H	G	N	Q	L	M	x 1 m run (kg/m)	fixed (kg)	movement x 1 m	filling x 1 m
C97	80	5 7,5	114,3	4	260	200	25	20	270	340	25	22	580	355	240	M30	21 25	61 62	5	3,8
C97	85	5 7,5	114,3	4	260	200	25	20	270	340	25	22	580	355	240	M30	23 27	43 45	5,6	3,2
C97	90	5 10	133	4,5	260	200	25	20	270	340	25	22	580	355	240	M30	25 34	65 67	6,4	5,7
		7,5 12															30 37	66 68		
C97	100	5 10	139,7	4,5	260	200	25	20	270	340	25	22	580	355	240	M30	27 37	66 68	7,8	5,6
		7,5 12															32 41	67 69		
C97	110	5 10	152,4	5	340	280	25	22	330	400	30	26	600	365	255	M30	32 43	98 100	9,5	6,4
		7,5 12															38 48	99 101		
C97	120	5 10	159	5	340	280	25	22	330	400	30	26	600	365	255	M30	35 46	103 108	11,3	6,1
		7,5 12,5															40 52	106 109		
C97	130	5 10	177,8	5,6	340	280	25	22	330	400	30	26	600	365	255	M30	39 53	114 117	13,3	8,5
		7,5 12															46 59	116 118		
C97	150	6 10	193,7	5,9	340	280	25	22	330	400	30	26	600	365	255	M30	49 62	118 121	17,7	8,3
C97	180	10	244,5	8	340	280	30	30	400	500	35	32	660	410	315	M60	89	204	25,4	15,6
C97	200	10	273	10	340	280	30	30	400	500	35	32	660	410	315	M60	112	213	31,4	18,9
C97	230	15	298,5	10	340	80	30	30	400	500	35	32	660	410	315	M60	151	258	41,5	19,4

Max static pressure 45 bar

3.4 C97 CYLINDERS - DIRECT SIDE ACTING

Upper cushioned end



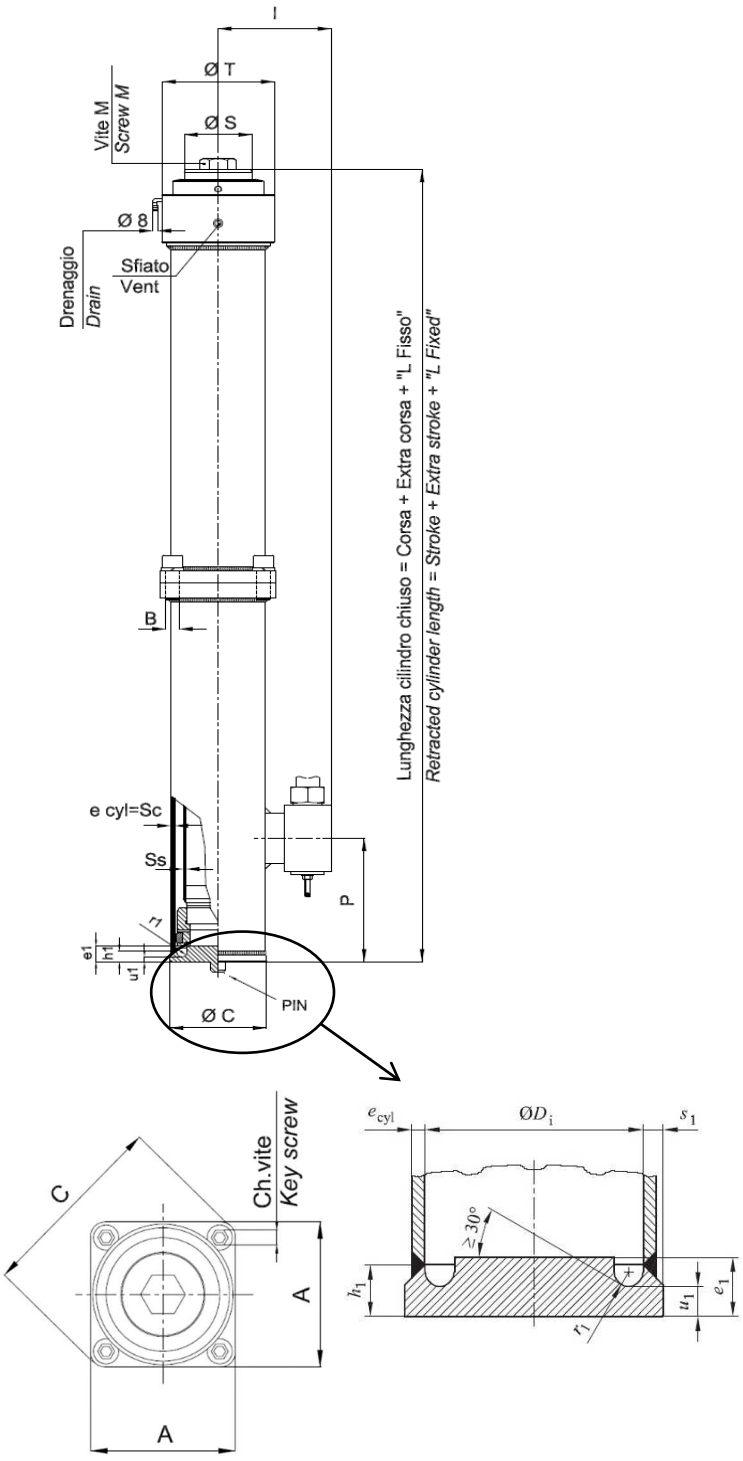


	ROD		BARREL		OSCILLATING PLATE						BASE PLATE				VALVE		FISSO	SCREW	WEIGHT			OIL l/m	
	ØS	Ss	ØC	Sc	A	B	C	D	Sp	ØE	F	G	H	I	P	Q	L	M	x 1 m travel (kg/m)		fixed (kg)		movement x 1 m	filling x 1 m
C97	80	5	114,3	4	150	250	100	200	25	20	160	300	110	250	210	355	240	M30	21	25	40	41	5	3,8
C97	85	5	114,3	4	150	250	100	200	25	20	160	300	110	250	210	355	240	M30	23	27	43	45	5,6	3,2
C97	90	5	133	4,5	150	250	100	200	25	20	160	300	110	250	215	355	240	M30	25	34	30	37	44	46	45	47	6,4	5,7
C97	100	5	139,7	4,5	150	250	100	200	25	20	180	300	120	250	215	355	240	M30	27	37	32	41	45	47	46	48	7,8	5,6
C97	110	5	152,4	5	150	250	100	200	25	22	200	400	150	350	215	365	255	M30	32	43	38	48	59	61	60	62	9,5	6,4
C97	120	5	159	5	150	250	100	200	25	22	200	400	150	350	215	365	255	M30	35	46	40	52	64	69	67	70	11,3	6,1
C97	130	5	177,8	5,6	150	250	100	200	25	22	220	400	160	350	215	365	255	M30	39	53	46	59	75	78	77	79	13,3	8,5
C97	150	6	193,7	5,9	150	250	100	200	25	22	250	400	200	350	215	365	255	M30	49	62	54	82	79	80	17,7	8,3
C97	180	10	244,5	8	300	400	250	350	30	30	280	450	230	400	225	410	315	M60	89		152		25,4	15,6
C97	200	10	273	10	300	400	250	350	30	30	310	450	260	400	225	410	315	M60	112		161		31,4	18,9
C97	230	15	298,5	10	300	400	250	350	30	30	330	450	280	400	225	410	315	M60	151		206		41,5	19,4

Max static pressure 45 bar

3.5 SLIM CS CYLINDER – INDIRECT SIDE ACTING

The new cylinders SLIM Ø80, Ø90, Ø100 and Ø110 are made according to the standard EN 81–2 and EN 81-20/50. with the cylinder diameter reduced in respect to the standard one (C97). They have a low weight and allowing to use a smaller amount of oil.
They are available in the version in indirect lateral size in one or two pieces.
Optimized for use mainly in small installations.
It is not possible to provide it with movement limiters.

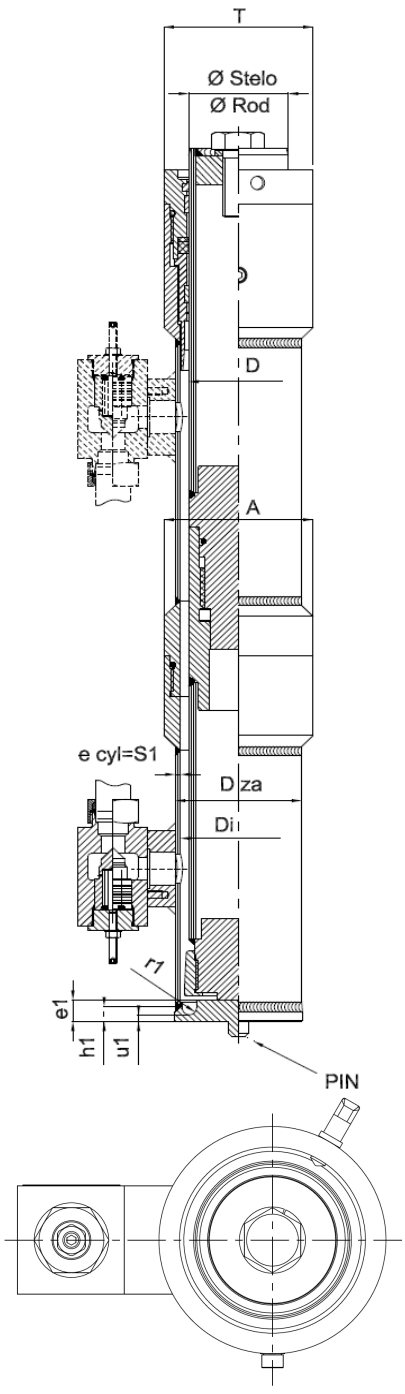


Max. static pressure 45 bar
Centering PIN (optional) Ø20x20 mm

	ROD		BARREL		BOTTOM PLATE					JOINT	FLANGE	HEAD	RUPTURE VALVE			FIXED	SCREW	WEIGHT		OIL l/m	
	ØS	Ss	ØC	Sc	s1	r1	u1	h1	e1	A	B	T	I	O	P	L	M	x 1m run (kg/m)	fixed (kg)	movement x 1m	filling x 1m
CS	80	5	101,6	3,6	3,6	5	5	10	16	130x130	M14	130	150	395	100	205	M18	22	28	5,0	2,0
		7,5																27	28		
CS	90	5	114,3	4	4,5	7	6	15	20	140x140	M16	157	156	390	105	205	M30	20	32	6,4	2,6
		7,5																23	33		
CS	100	5	127	4,5	4,5	7,5	6,5	15	20	163x163	M18	166	163	390	105	205	M30	29	33	7,8	3,1
		7,5																32	34		
CS	110	5	139,7	4,5	4,65	7,5	6,5	15	20	172x172	M20	175	170	400	105	215	M30	30	37	9,5	3,9
		7,5																35	34		
		12																			

3.6 HC2 CYLINDERS

New HC cylinder with optimized performances and overall dimensions for direct and indirect drives and platform lifts.



	D	Dza	Di	S1	r1	u1	h1	e1	A	KEY SCREW	B	C mm	T mm	FLANGE WEIGHT kg	ROD JOINT WEIGHT kg (MAX)
HC	50	88,9	81,7	3,6	5	5	11	16	*	-	*	-	105	2	-
HC	60	88,9	81,7	3,6	5	5	11	16	*	-	*	-	105	2	3
HC	70	88,9	81,7	3,6	5	5	11	16	*	-	*	-	105	2	3

*JOINT HEAD

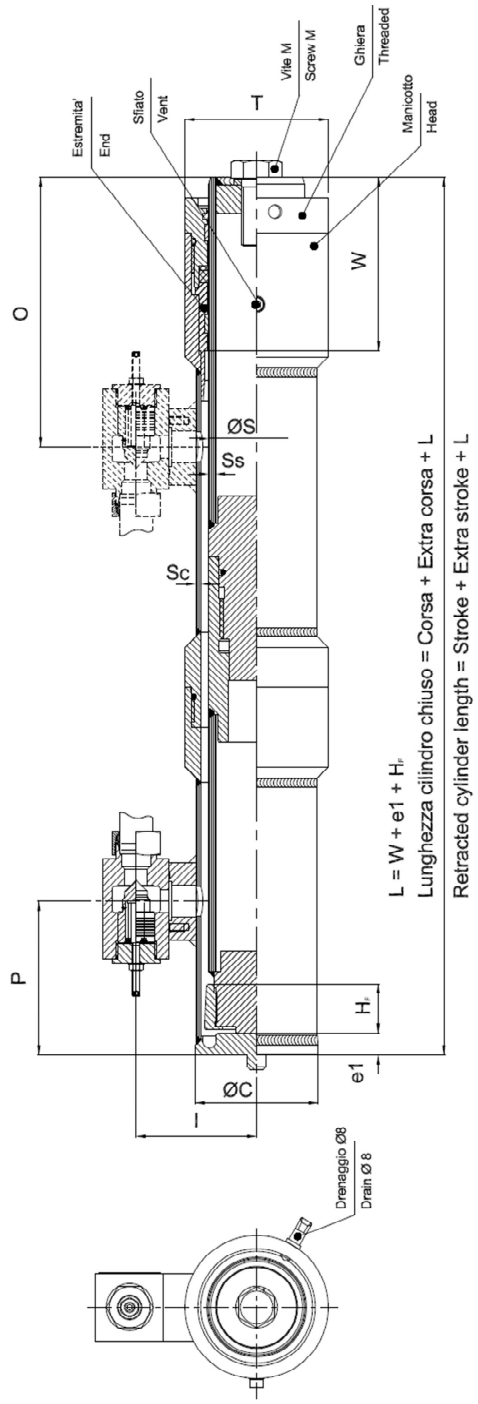
Centering PIN (optional) Ø20x7 mm

Max static pressure up to 70 bar depending on the normative applied.
Compliant to Machine Directive, Lift Directive, EN 81-2, EN 81-20/50.

- The weight of a two – piece rod is obtained by summing the one – piece rod weight to the rod joint weight.
- The weight of a two – piece complete cylinder is obtained by summing the one – piece cylinder weight to the rod joint weight and to the two flanges' weight

3.7 HC2 CYLINDERS - INDIRECT SIDE ACTING

Upper cushioned end



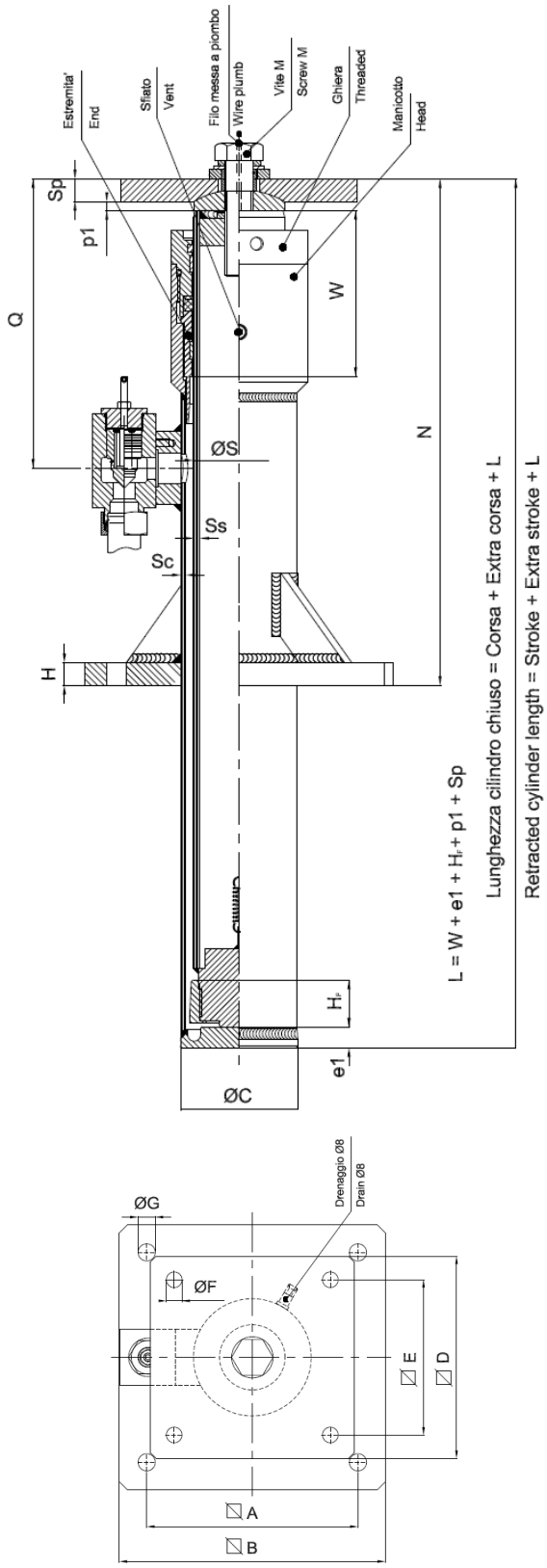
	ROD		BARREL		HEAD	VALVE			FIXED	SCREW	WEIGHT		OIL l/m	
	ØS	Ss	ØC	Sc	T	I	O	P	L	M	x m 1 travel (kg/m)	Fixed (kg)	movement x 1 m	filling x 1 m
HC2	50	5	88,9	3,6	105	93	343	211	179	M18	13	13	2	3,1
HC2	60	5 FULL	88,9	3,6	105	93	343	211	179	M18	14 30	13 13	3	2,4
HC2	70	5 7,5 12	88,9	3,6	105	93	343	211	179	M18	16 19 25	13 13 15	3,8	1,4

Centering PIN (optional) Ø20x7 mm

Max. static pressure 45 bar

3.8 HC2 CYLINDERS – DIRECT CENTRAL ACTING

Upper cushioned end

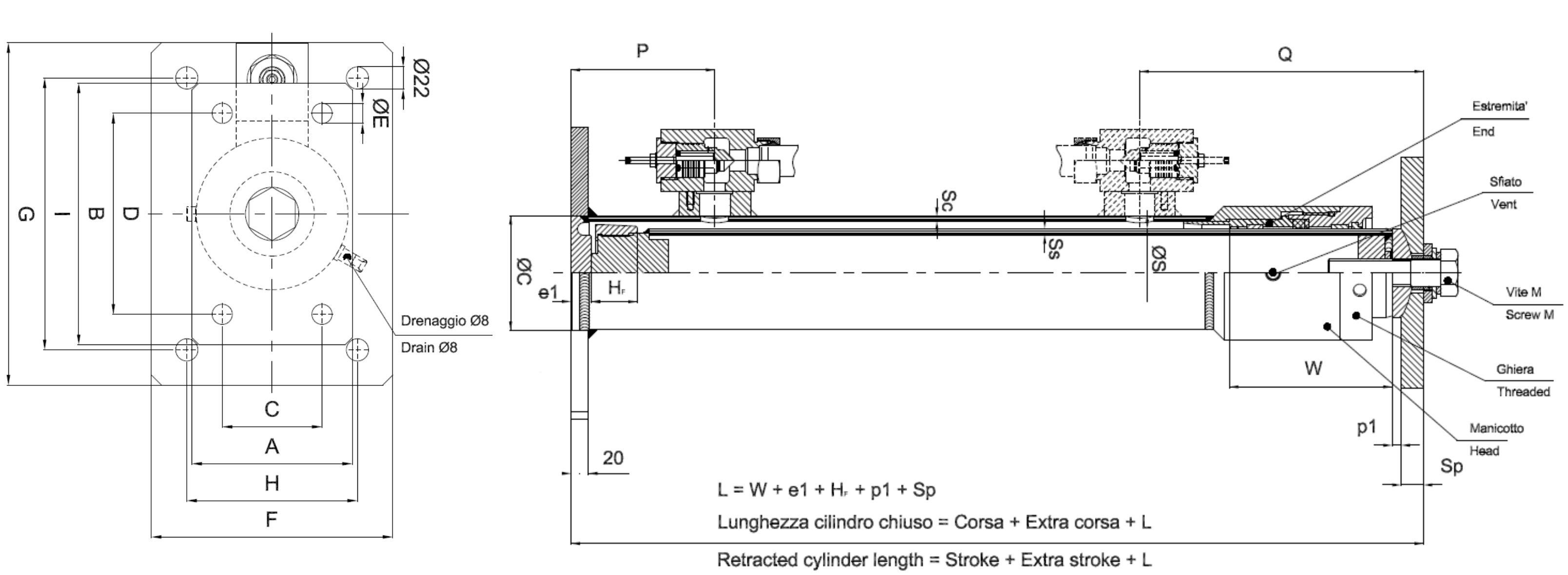


	ROD		BARREL		OSCILLATING PLATE				BASE PLATE							FIXED	SCREW	WEIGHT Kg		OIL l/m	
	ØS	Ss	C	Sc	D	E	Sp	F	A	B	H	ØG	N	Q		L	M	X 1 m travel (kg/m)	Fixed (kg)	movement x 1 m	filling x 1 m
HC2	50	5	88,9	3,6	160	120	15	18	220	270	20	20	580	340		199	M20	16	36	2	3,1
HC2	60	5 FULL	88,9	3,6	260	200	25	20	220	270	20	20	580	340		214	M30	14,3 30	36 36	3	2,4
HC2	70	5 7,5 12	88,9	3,6	260	200	25	20	220	270	20	20	580	340		214	M30	16 19 23	36 36 36	3,8	1,4

Max. static pressure 45 bar

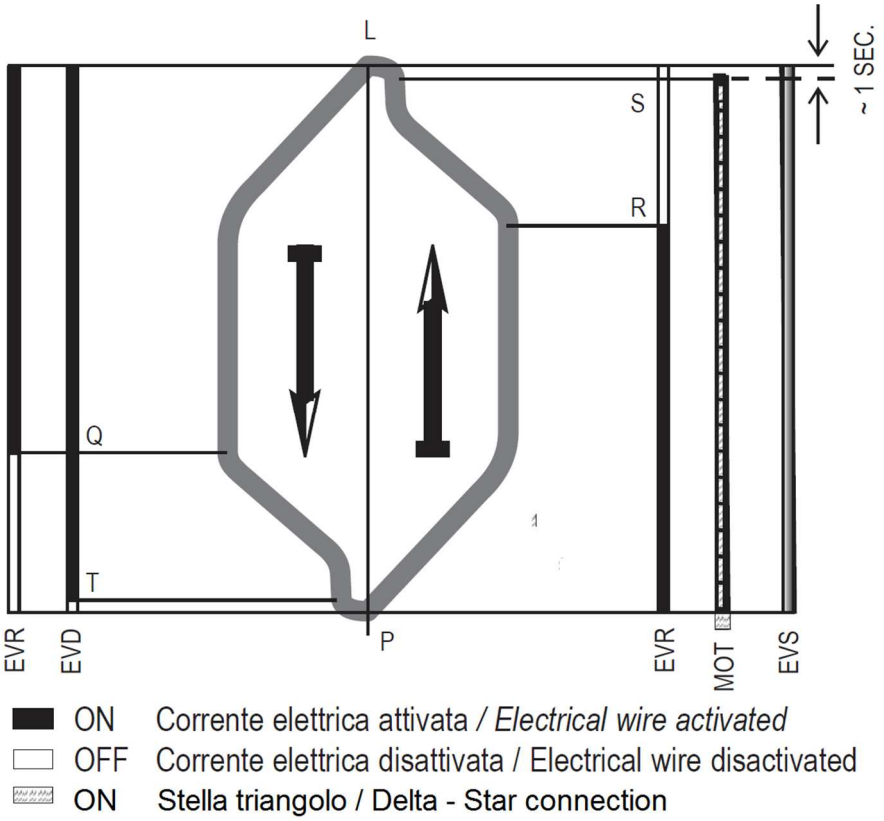
Upper cushioned end

Max. static pressure 45 bar



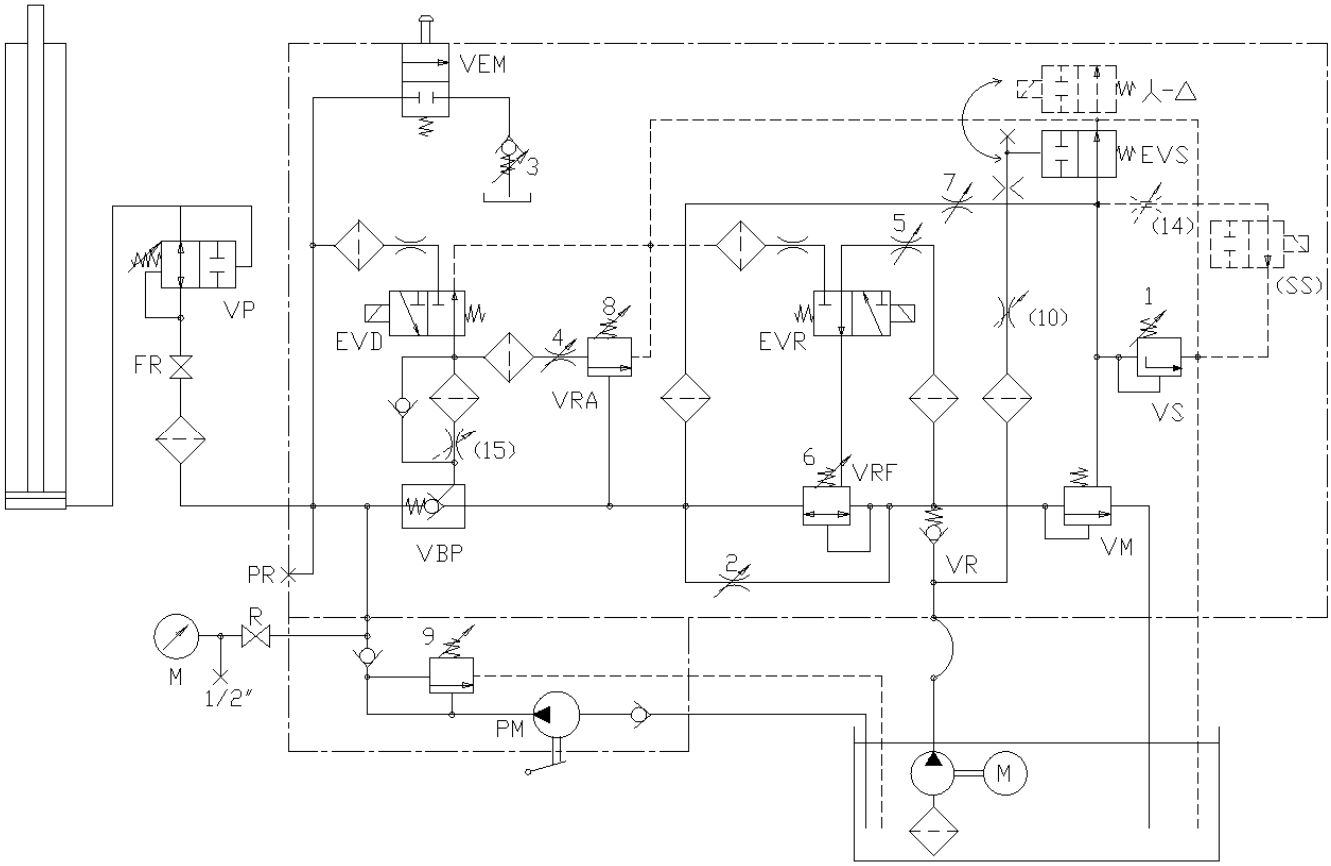
	ROD		BARREL		OSCILLATING PLATE						BASE PLATE				VALVE		FIXED	SCREW	WEIGHT Kg/m		OIL l/m	
	ØS	Ss	ØC	Sc	A	B	C	D	Sp	ØE	F	G	H	I	P	Q	L	M	x 1 m run	fixed	movement x 1 m	filling x 1 m
HC2	50	5	88,9	3,6	150	250	100	200	15	18	130	300	80	250	211	363	199	M20	13	26	2	3,1
HC2	60	5 FULL	88,9	3,6	150	250	100	200	25	20	130	300	80	250	211	378	214	M30	14 30	26 26	3	2,4
HC2	70	5 7,5 12	88,9	3,6	150	250	100	200	25	20	130	300	80	250	211	378	214	M30	16 19 25	26 26 26	3,8	1,4

3.10 ELECTRICAL FUNCTIONING DIAGRAM OF NL VALVE



Available voltages for coils:	12 – 24 – 48 – 60 – 80 – 110 – 180 – 220 VDC. Emergency: 12 VDC.
Coil power:	EVS: 36 W EVD: 36 W + 45 W EVR: 36 W
P – UP TRAVEL:	Feed motor and coil “EVR” Feed coil “EVS” for λ – Δ start o soft starter
R – UP TRAVEL DECELERATION:	Disconnect “EVR”
S – STOP DURING UP TRAVEL:	Stop motor (disconnect “EVS”, if it exists, about 1sec after the motor)
L – DOWN TRAVEL:	Feed coils “EVD” and “EVR”
Q – DOWN TRAVEL DECELERATION:	Disconnect “EVR”
T – STOP DURING DOWN TRAVEL:	Disconnect “EVD”

3.11 HYDRAULIC SCHEME VALVE TYPE “NL”

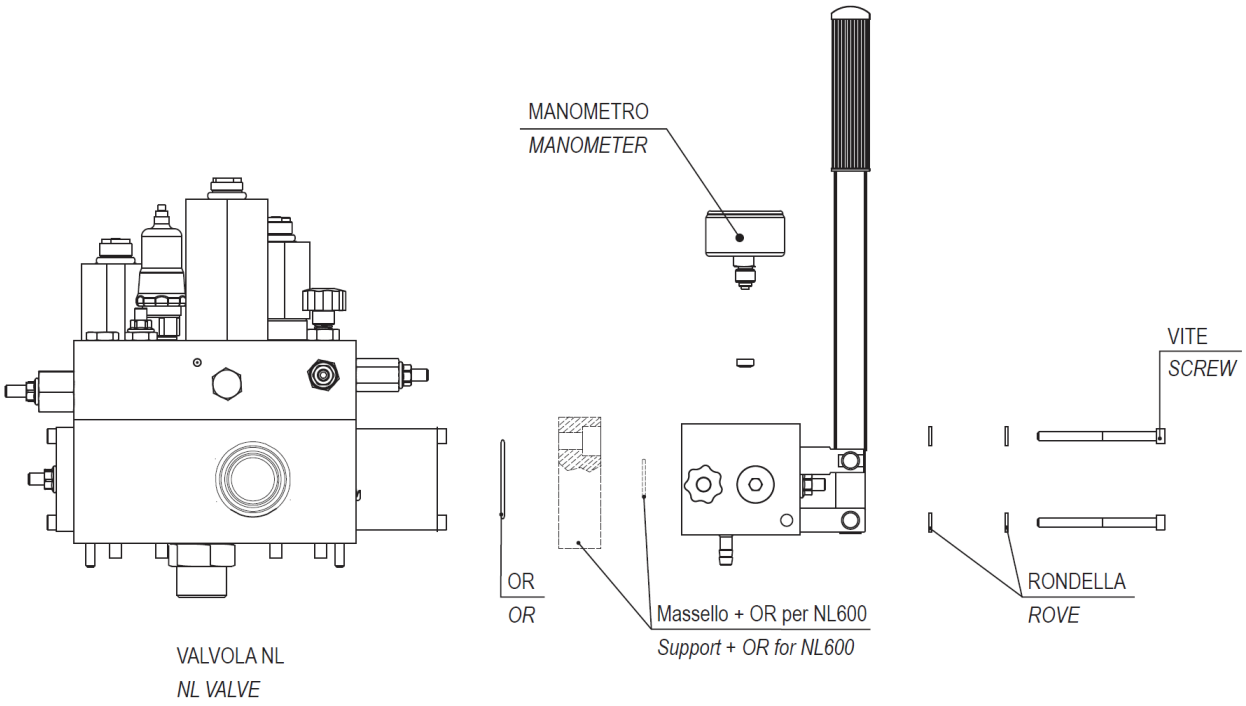


LEGENDA

VR	=	Non – return valve.
VM	=	Max. pressure valve.
VS	=	Safety valve.
VRF	=	Flow – regulation valve.
VRA	=	Down travel balancing valve.
VBP	=	Pilot block valve.
EVD	=	Down travel electrovalve.
EVR	=	Flow – regulator electrovalve.
EVS	=	Up travel electrovalve.
VEM	=	Emergency.
VP	=	Rupture valve.
FR	=	Shut – off valve.
R	=	Shut – off valve and inlet 1/2" Gas for the control manometer.
M	=	Manometer.
PM	=	Hand pump.
PR	=	Inlet for the pressure switch.
(SS)	=	Soft Stop (optional)
1, 2,…,(14)…	=	Number of regulating screws

4 ACCESSORIES

4.1 HAND PUMP PM – 6



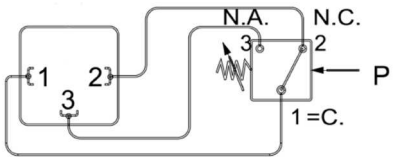
The hand pump is fixed on the valve body of NL 210 and NL 380 directly, by means of 4 screws type M6 o M8 respectively.
Washers are used as spacers only on valve NL 210. The manometer and its shut – off have to be removed from the closure flange and assembled on the hand pump as shown in the picture above unless already existing on the pump.

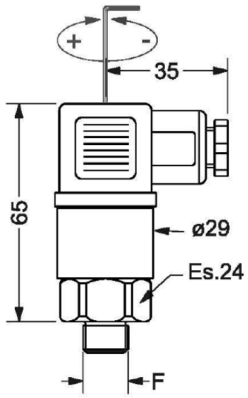
The hand pump is fixed on the adapting flange of the valve NL 600 by means of 4 screws type M8.
The adapting flange is fixed on the valve body by means of 4 screws type M10 x 30.
In case the valve NL 600 is not equipped with a hand pump, the adapting flange also serve as a closing flange. For special versions contact OMARLIFT Sales Department

4.2 PRESSURE SWITCHES

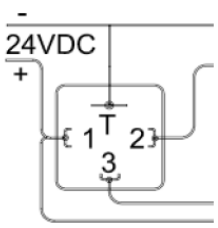
4.2.1 OVERLOAD PRESSURE SWITCH

MECHANICAL OVERLOAD PRESSURE SWITCH





ELECTRONIC OVERLOAD PRESSURE SWITCH



Pin 1 = + 24VDC

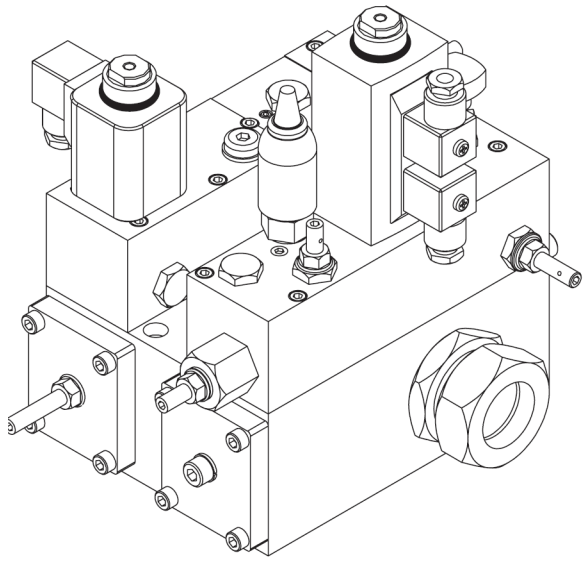
Pin 2 = OUT 1

Pin 3 = OUT 2

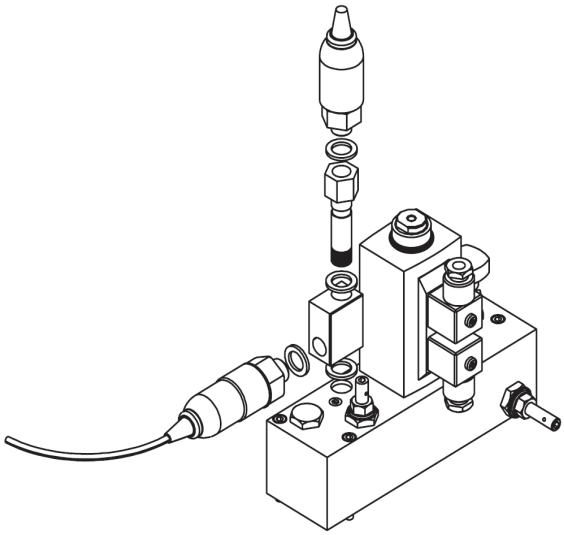
Pin T = 0V

FEATURES	MECHANICAL OVERLOAD PRESSURE SWITCH	ELECTRONIC OVERLOAD PRESSURE SWITCH
TYPE	F4V / M3	IP54 / F33
Pressure range Switching accuracy Hysteresis Alternating current Direct current Temperature Protection	10 ÷ 100 bar ± 4% end of scale 10% end of scale 250 VAC / 0,5 A 110 VDC / 0,15 A -25 ÷ 85° C IP65	0 ÷ 100 bar ± 1% end of scale SETTABLE 42 VAC / 2 A 12 - 24 VDC / 0,5 A -20 ÷ 80° C IP65

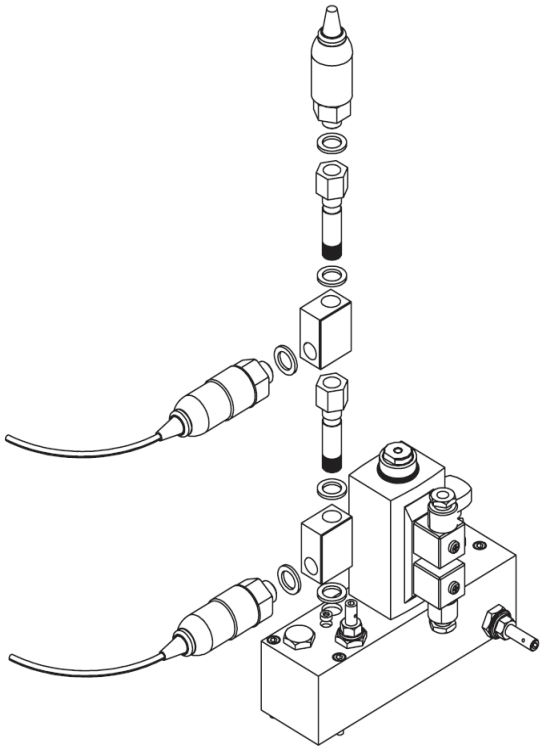
4.2.2 PRESSURE SWITCH (ES) ASSEMBLING



Assembling of a single pressure switch



Assembling of two pressure switches

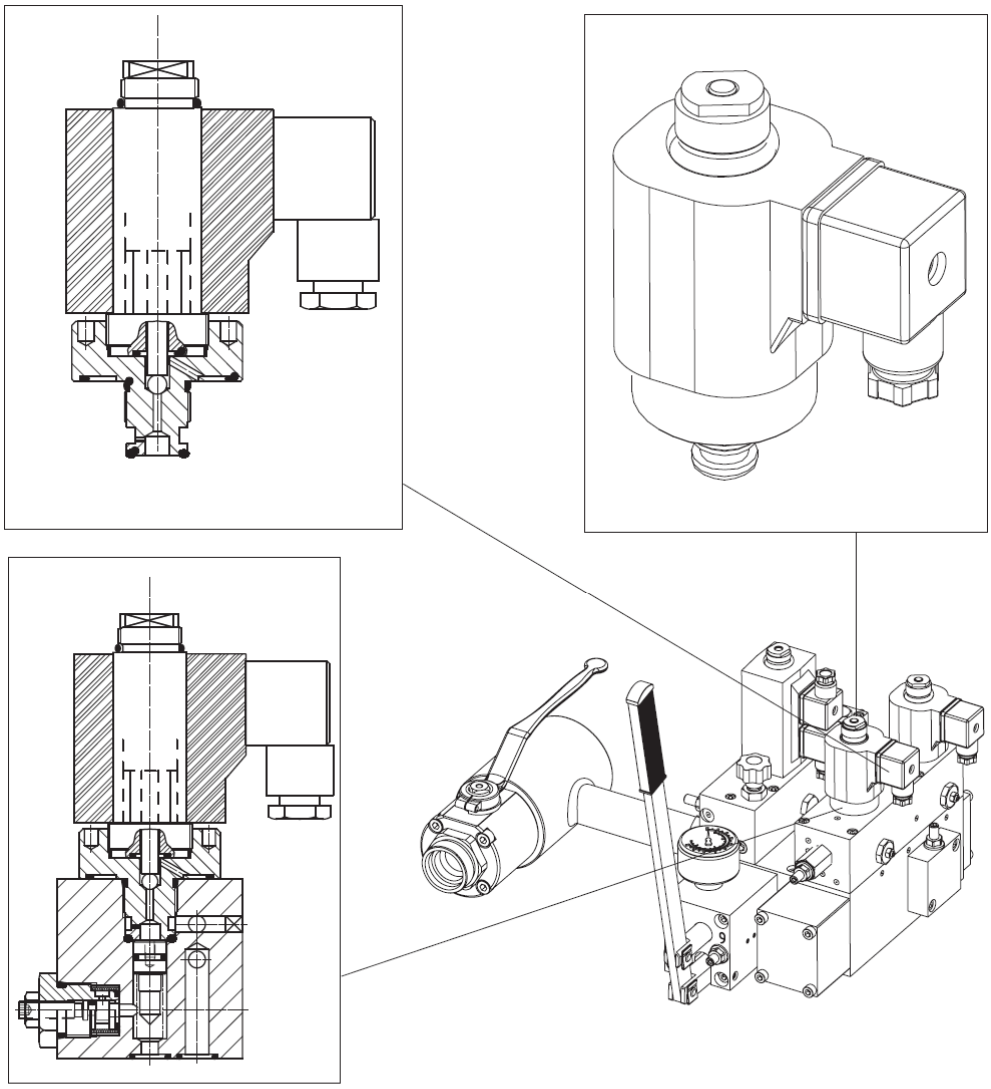


Assembling of three pressure switches

4.3 TRAVEL CONTROL DEVICES

4.3.1 ELECTRIC DEVICE (EVS VALVE) FOR START DELAY FOR λ – Δ OR SOFT STARTER STARTING

For optimizing the upward start phase in case of installations with star-delta switching for electric motor wiring, or with soft-starter, it is possible to install an electric device that consent a precise management of the delay for the system pressurization, synchronizing it to the real end of the motor starting. The optional system provides a specific upward pilot and an additional EVS coil.



EVS electrovalve: Pressure control in upward direction

When EVS coil is released, the pressure inside the valve is almost zero and the oil runs back to the tank.

When EVS coil is electrically excited, the pressure inside the valve reaches the dinamic pressure value in upward direction and keeps it until the electrical power is on.

EVS electrovalve is used in installations with powerful motors in order to delay the pressure increase and make the motor start without high current absorption.

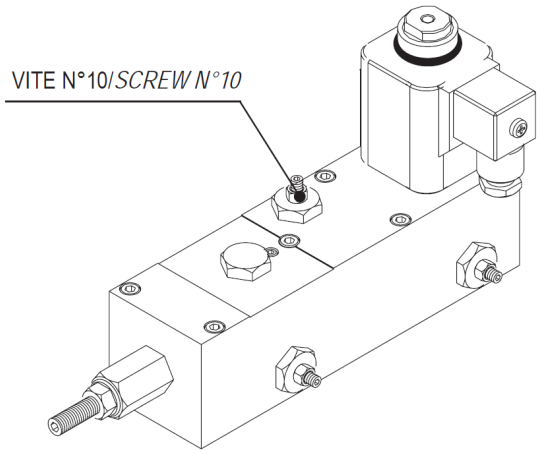
4.3.2 HYDRAULIC DEVICE (SCREW nr.10) FOR UPWARD START DELAY FOR SOFT STARTER

Alternatively to the electric solution (EVS), in order to optimize the soft – starter functionality, OMARLIFT make available, upon request, a hydraulic device that delays the upward start.
This delay, which is also adjustable, allows whatever kind of soft - starter to start up smoothly the motor, and with the minimum starting current (1,2 ÷ 1,6 times the nominal current) without requiring the third coil on the valve block.
As during the startup time the motor cannot provide power, it's necessary that the upward starting happens only when the motor is at its full capacity.
The delay in the upward starting happens through the adjustable strangler of the screw n°10. Screwing the screw n°10, the time to put the valve under pressure increases, unscrewing it, this time decreases. The special design of the strangler allows to obtain an almost constant delay at the oil temperature variation, and this enables its use even on standard valves.
The screw n°10 has to be adjusted properly so that the car begins to move upward only when the motor has reached its full capacity.
The table below describes the advantages of the hydraulic system in respect to the electric solution

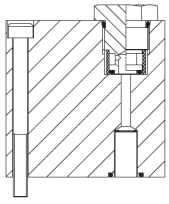
+	-
Without any additional electrical coil and wirings from the control panel, that means reduced costs.	Less precision in management of starting phase, with requested time a little bit longer.
The elevator starts movement with a reduced delay, as soon as the motor has reached its full speed and power	Less repeatability for the activation time, depending from oil temperature (cold/hot)

It doesn't use any coil, therefore no electrical connections are needed.

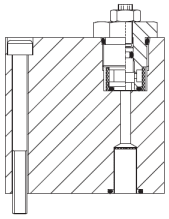
The lift starts without delays as soon as the motor is fully operating.



Ascent pilot block with adjusting delay screw n°10



Versione standard / *Standard version*

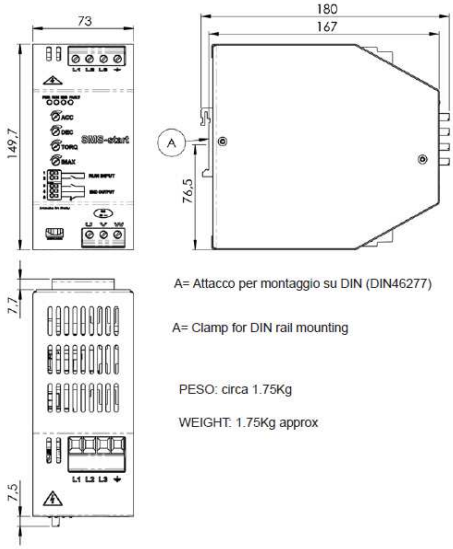


Versione con dispositivo di ritardo partenza regolabile
Version with upward start delaying adjustable device

4.3.3 SOFT – STARTER CIRCUIT BOARD

The soft starter circuit board is designed to have a progressive start by three phases inductive motors so to reduce the value of the starting current and torque. The circuit board can be installed in places free of dust and not exposed to corrosive gas or sunlight, at an altitude of no more than 1000 m o.s.l. with an environmental temperature 0 – 40° C.

- Maximum usage – flexibility: it can be easily installed on every system.
- Possibility of acceleration time, starting torque and current limit configuring
- Together with screw n°10 device, increases the comfort.
- Lower mechanical stress and system wear.
- Diagnostic function towards possible failures through a combination of LED.



TECHNICAL SPECIFICATIONS

	TYPE	
	SSV040	SSV070
Power supply	230 V or 400 V	400 V
Nominal current	40 A	70 A
Max. starting current	120 A	180 A
Acceleration	1 – 7 sec	1 – 7 sec
Starts / hour	15 - 75	15 - 75
Typical starting current	1,4 ÷ 1,7 In	1,4 ÷ 1,7 In
Protection	-	-
Weight	1,75 Kg	1,75 Kg

4.3.4 SOFT STOP DEVICE

The comfort should be a must for each elevator. In order to achieve better results and to obtain a stop to the floor extremely smoothed and comfortable, even after an upward travel, the OMARLIFT NL valve can be equipped, upon request, with a Soft Stop device, that consent to manage properly the stopping phase, without any influence on all other functionalities.

The Soft Stop device provides essentially a specific upward pilot in aluminium, a dedicated hydraulic circuit, an additional coil and a regulation screw.

SOFT STOP pilot

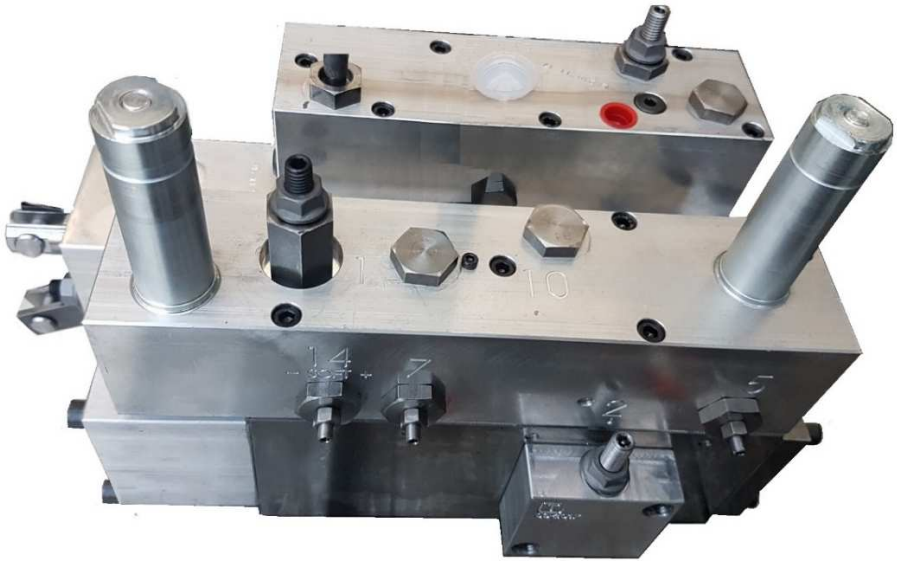
The position of the regulation screw, consent to define the behaviour of the valve during the last part of the stopping phase, and to increase the performances in term of comfort.

To consent the correct function of the device, a delay of about 1s in the motor-off phase is required, after the floor sensor activation, using an appropriate delay in the control panel.

The Soft Stop device is in NO execution, normally open, so if the coil is not energized, the elevator doesn't start any movement. If the regulation is correctly done, when the cabin moves at slow speed, if you de-energize the coil, the cabin has to stop smoothly, in a space of about 10mm.

The Soft Stop regulating device remains compatible with all valve functionalities, as for instance EVS, screw nr.10 and with the other regulations of the valve and it results independent from all those.

The Soft Stop pilot could be installed even on existing NL valves to increase their performances, and in this case obviously even a modification of the control panel is required, to manage the additional electric coil.

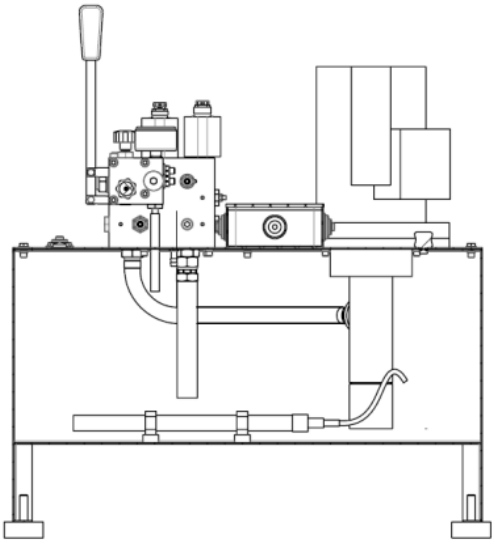


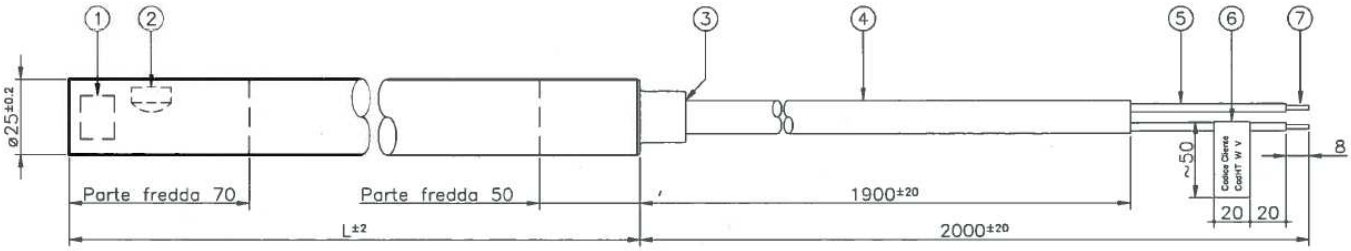
NL Valve with SOFT STOP pilot installed on it

4.4 HEATING DEVICE

4.4.1 OIL HEATING RESISTOR: FEATURES, APPLICATIONS AND ASSEMBLING

The resistor provided by OMARLIFT is tubular type, self – regulated. Thanks to an emergency thermostat, the shutdown is guaranteed in the event of damage of the main one.
The resistor is fixed to the bottom of the tank by means of two supports with magnet mounted with a joint.
Once electrically connected, the resistor only works when the oil temperature decreases below the adjusting level of the thermostat.





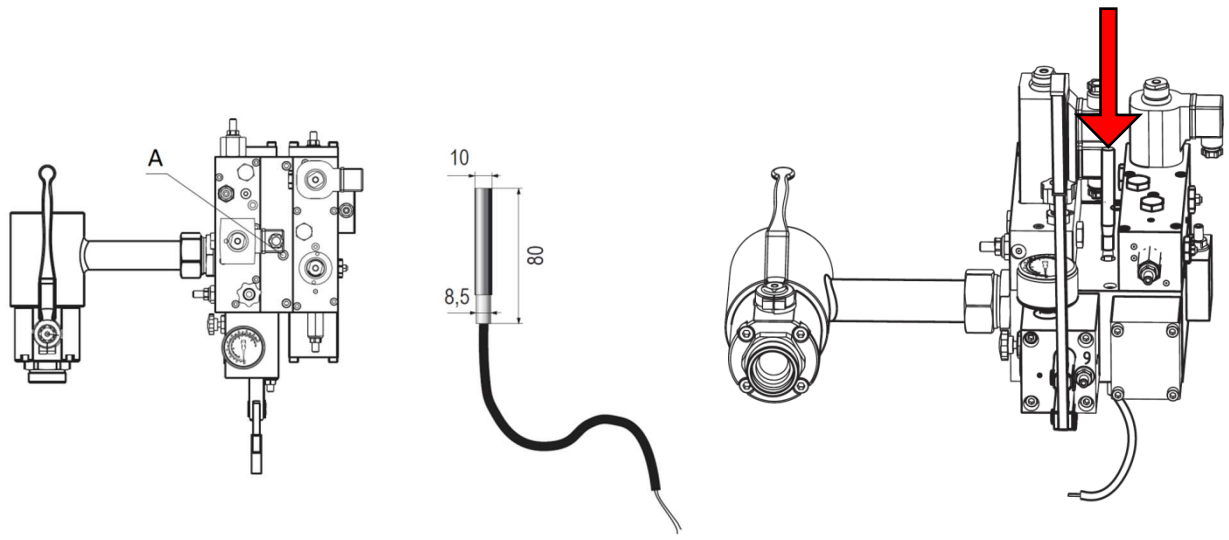
HT CODE	CUSTOMER CODE	POWER	VOLTAGE	LENGTH	WIRE COLOR
LT71732	CA106260	500 W	230 V	430	Red
LT71733	CA106261	500 W	400 V	430	Blue
LT71734	CA106262	300 W	230 V	330	Red
LT71735	CA106263	300 W	400 V	330	Blue

The operating temperature range is: T_{ON}=20±4°C, T_{OFF}=30±3°C

⚠ Heating resistors cannot be tested on the open air because they may not turn on, or break down. For the test it is mandatory to follow a specific procedure. Please contact OMARLIFT Service.

4.4.2 NL VALVE BLOCK HEATING RESISTOR: FEATURES, APPLICATIONS AND ASSEMBLING

The resistor to heat the valve block is used with good results on installations with reduced load, short car travels and with a machine room with temperatures not lower than 10/12°C.
If the temperature in the machine room is too low and the oil quantity is very big, the valve block cools quickly and the resistor heating power is not very efficacious. In these cases the heating resistor for the valve block can be used together with a heating resistor for oil.
For a correct application of the heating resistor on the "NL" valve, insert the resistor inside the hole "A" located on the block valve as shown in Pic. 1; the connecting cable has to be oriented towards the inward side of the tank has per Pic. below.



Pic. 1 Application of a 60 W resistor on "NL" valve

ELECTRICAL FEATURES	
Power	60 W
Voltage	230 – 400 V
Frequency	50 – 60 Hz

Application:

- Unscrew the cap "A" - Pic. 1.
- Insert the resistor as shown by arrow.
- Screw again the cap "A".
- Connect the resistor cables into the pump unit electrical board.
- Feed the resistor with the correct voltage.

4.5 OIL COOLING SYSTEM

In case of installations with high traffic or with severe operating conditions, it may be necessary to provide an oil cooling system for improving the performance and life of the system.

4.5.1 OIL COOLING SYSTEM WITH AIR

4.5.1.1 CHARACTERISTICS

An oil cooling system with air is made up by the following main components:

- Oil – air heat exchanger equipped with fan.
- Electric motor activating the pump which makes the oil forced flow and moves even the fan.
- Thermostat for the regulation of the max. temperature wanted for the oil (the thermostat has to be assembled in the tank and set at about 40/50°C).
- Suction valve located in the suction pipe inside the tank to avoid the pipe from emptying.
- Pipes connecting to the pump unit.
- Electrical control panel able to feed the electropump motor and the fan motor.

⚠ ATTENTION: the control panel is not supplied together with the oil cooling system, but it has to be prepared at the Customer's care or requested when making an order.

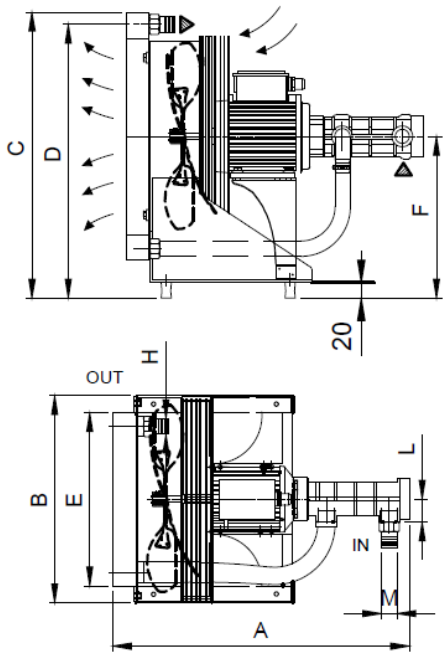


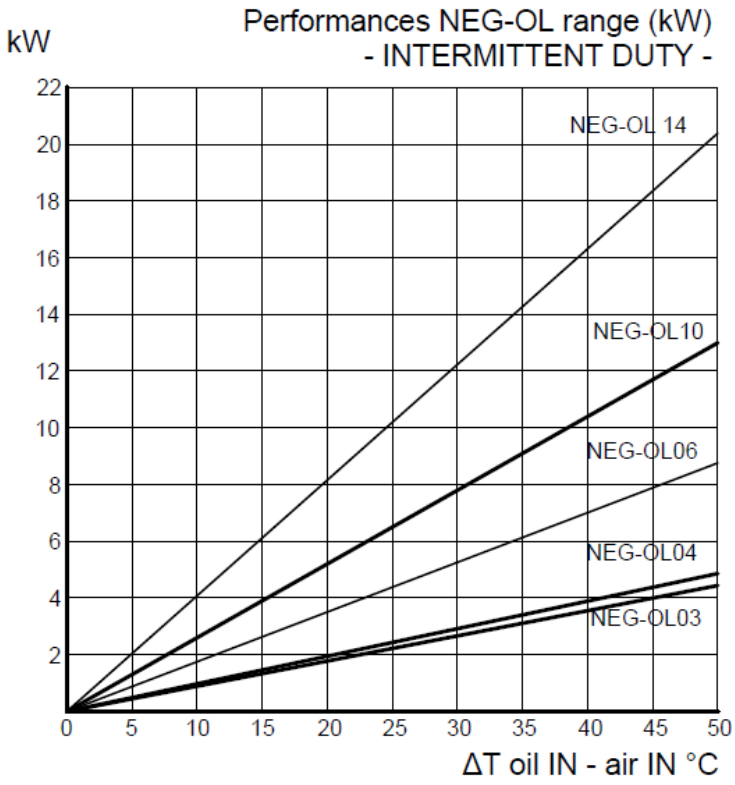
Table of dimension (mm)

Tipo / Type	A	B	C	D	E	F	H	L	M
NEG#06...OL	578	409	538	515	335	303	1" GAS	44	1" GAS
NEG#10...OL	578	409	538	515	335	303	1" GAS	44	1" GAS
NEG#14...OL	637	528	710	640	457	343	1" GAS (**)	44	1"1/4" GAS (*)

(*) 1"1/4 GAS is the pump suction port. On the pump suction port is mounted a fitting 1"1/4 GAS on pump side, on the connection side of the tube is Ø30 mm.

(**) 1" GAS is the radiator hole. When the fitting is mounted the tube connection is Ø30 mm.

The followings are the functions of the oil cooling system with air: as the temperature exceeds the thermostat set value, the thermostat closes the electrical contact.
A relay switch immediately activates both the fan and the pump for the oil forced circulation. As a consequence, the oil temperature will go down the thermostat adjusting value again, and the installation will stop.



ΔT = **T oil IN - T air IN**

TYPE	NEG #06	NEG #10	NEG #14
MAX DISSIPATED POWER	6,98kW	10,5 kW	16,28 kW
MAX QUANTITY OF DISSIPATED HEAT	6000 Kcal/h	9000 kcal/h	14000 kcal/h
MOTOR POWER FOR FAN	0,40 kW	0,40 kW	0,55 kW
AIR FLOW CAPACITY	1300 m^3/h	1300 m^3/h	2500 m^3/h
NOISE	68 dB (A)	68 dB (A)	71 dB (A)
NET WEIGHT	35 kg	35 kg	55 kg

AVAILABLE VOLTAGE
230/400 V 50/60 Hz

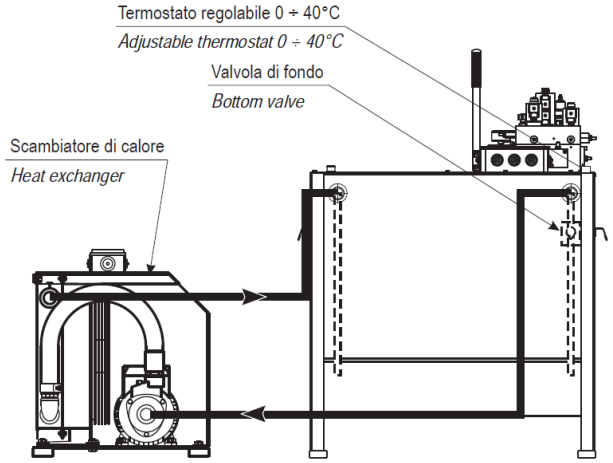
4.5.1.2 AIR COOLING SYSTEM CONNECTING SCHEME 7 kW – 10 ,5kW – 16,4 kW

If the oil cooling system is required together with the pump unit, the connections needed for suction and oil return to the tank are already arranged in the factory. The pipe connection will be carried out by the Customer simply by connecting at first the oil inlet of the electropump to the tank connection which brings to the suction valve and then by connecting the outlet from the heat exchanger to the other connection always in the tank.

⚠ Connecting the pipes to the heat exchanger, mandatory respect the circulating direction of oil.

The cooling kit includes:

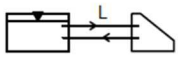
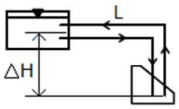
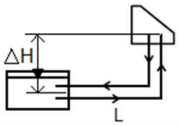
- Rubber hose for connection IN / OUT 3 + 3 meters.
- Bottom valve.
- Thermostat.
- Fittings.
- Clamps.



Modello corpo unico
Type with complete device

4.5.1.3 LENGTH AND DIAMETER PIPES

Length (m) and pipes diameter (inches)

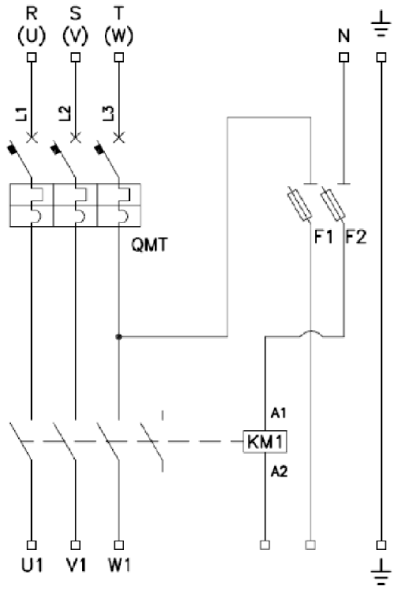
		diameter of pipe					
		3/4"	1"	1 1/4"	1 1/2"	2"	
		L (m)					
A	NEG-OL#03 NEG-OL#04	3	5	10	(*)	(*)	
	NEG-OL#06 NEG-OL#10	-					
	NEG-OL#14	-	2.5	5	10	(*)	
B	NEG-OL#03 NEG-OL#04	7	9	13	(*)	(*)	
	NEG-OL#06 NEG-OL#10	-					
	NEG-OL#14	-	6.5	9	(*)	(*)	
C	NEG-OL#03 NEG-OL#04	-	-	6	(*)	(*)	
	NEG-OL#06 NEG-OL#10	-					
	NEG-OL#14	-	-	-	6	(*)	

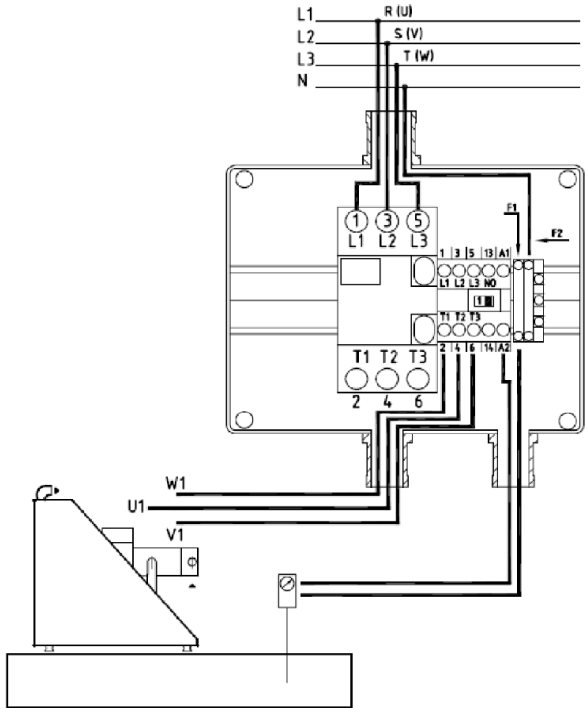
△H max 4m

(*) 10 - 50 m :
OMARLIFT

⚠ 1x ⇨ L - 3 (m)
1x ⇨ L - 2 (m)

4.5.1.4 ELECTRICAL SCHEME OF THE OIL COOLING SYSTEM WITH AIR 7 kW – 10,5 kW – 16,4 kW





STANDARD : EN 64 - 08 (NORMATIVA BASSA TENSIONE 7323) ; SPECIAL : EN 60 204 - 1

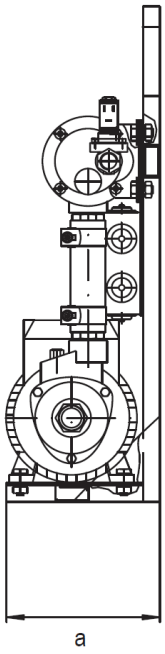
4.5.2 OIL COOLING SYSTEM WITH WATER

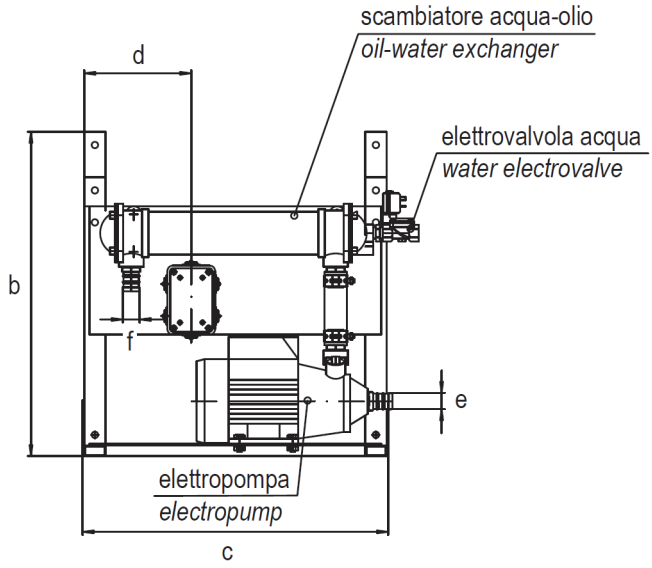
4.5.2.1 CHARACTERISTICS 10,5 kW – 21 kW

In the oil cooling system, the thermostat used to control the oil temperature operates either the electropump for the oil circulation and the electrovalve for the opening and closure of the running water. Consequently, the water consumption is limited to the time during which the oil cooling system is actually working. An oil cooling system with water is made up by the following main components:

- Oil – water heat exchanger.
- Electropump with three – phase motor of about 1,5 kW; which makes the oil forced circulation.
- Thermostat for the regulation of the max. temperature wanted for the oil (the thermostat has to be assembled in the tank and set at about 40/50°C).
- Water electrovalve with a coil 48 VDC. – 8 W. it controls the water line opening.
- Electrical control panel able to feed the electropump motor and the water electrovalve.

⚠ ATTENTION: the control panel is not supplied together with the oil cooling system, but it has to be prepared by the Customer or requested when making an order.

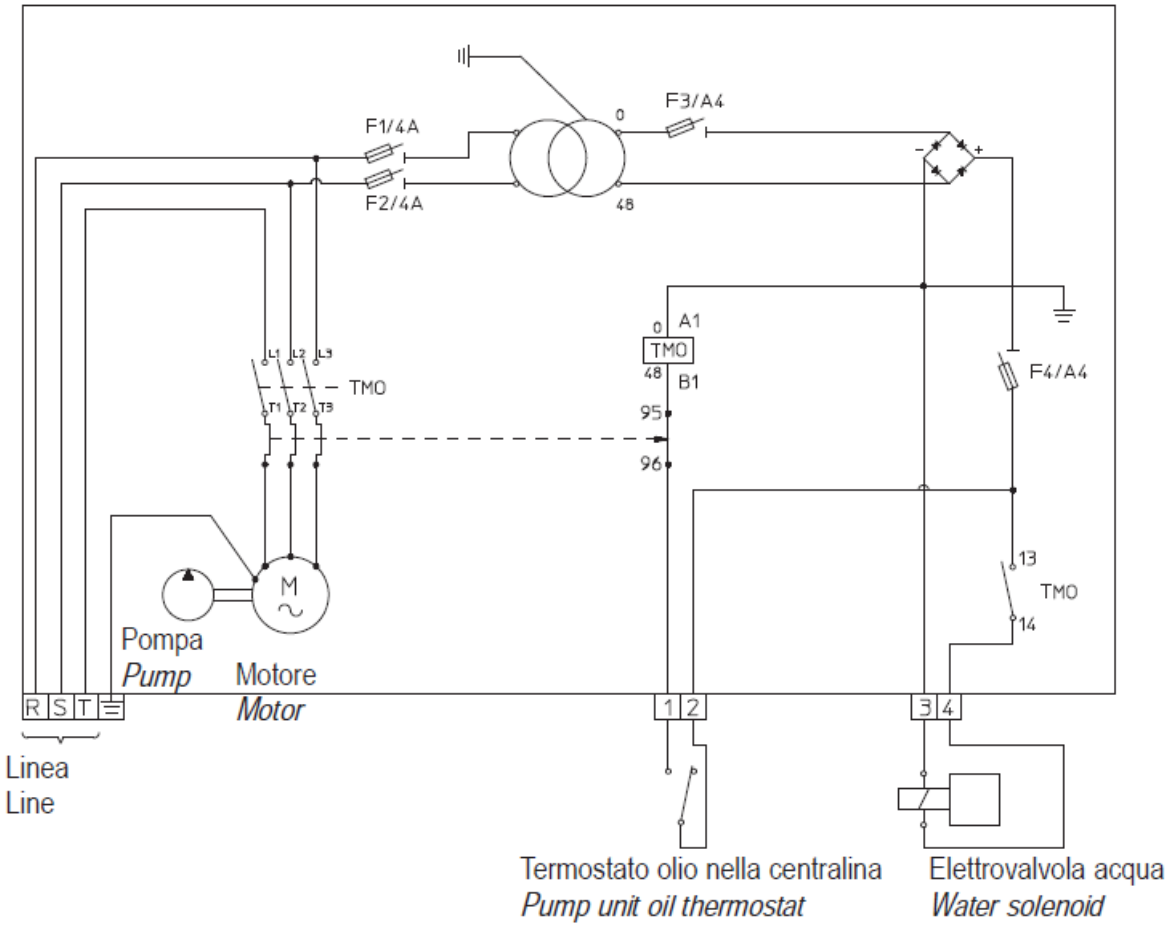




COOLING SYSTEM POWER	HEAT DISSIPATION	a	b	c	d	e	f	ELECTROVALVE CONNECTION
10,5 kW	9000 kcal/h	185	608	571	200	Ø 30	Ø 30	G1/2
21 kW	18000 kcal/h	215	673	716	160	Ø 40	Ø 40	G3/4

TYPE	10,5	21	AVAILABLE VOLTAGE
MAX DISSIPATED POWER	10,5 kW	21 kW	230/400 V 50/60 Hz 240/415 V 50 Hz 208/360 V 60 Hz
MAX QUANTITY OF DISSIPATED HEAT	9000 kcal/h	18000 kcal/h	
MOTOR POWER FOR OIL FLOW	1,1 kW	1,5 kW	
WATER CONSUMPTION PER HOUR	0,5 m^3/h	1 m^3/h	
MAX WATER PRESSURE	7 bar	7 bar	
DIMENSIONS	571 x 185 x 608 mm	716 x 215 x 673 mm	
NET WEIGHT	32 kg	64 kg	

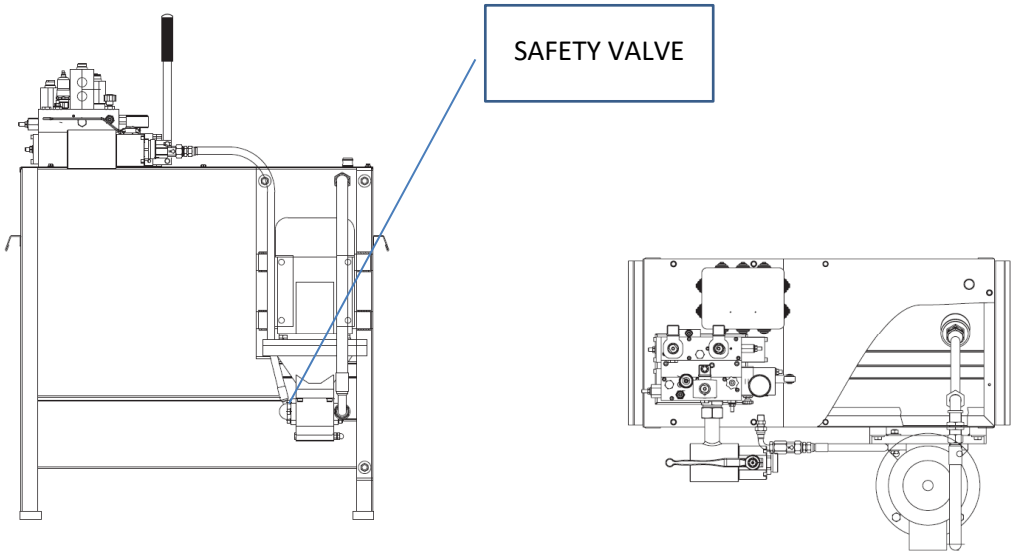
4.5.2.2 ELECTRICAL SCHEME OF THE OIL COOLING SYSTEM WITH WATER 10,5 kW – 21 kW



4.6 MICROLEVELLING

4.6.1 TECHNICAL FEATURES

The microlevelling is used in big load and traffic installations. The purpose of this device is to bring the car back to the floor avoiding the starting of the motor for few centimeters.



Microlevelling device with auxiliary motor-pump group

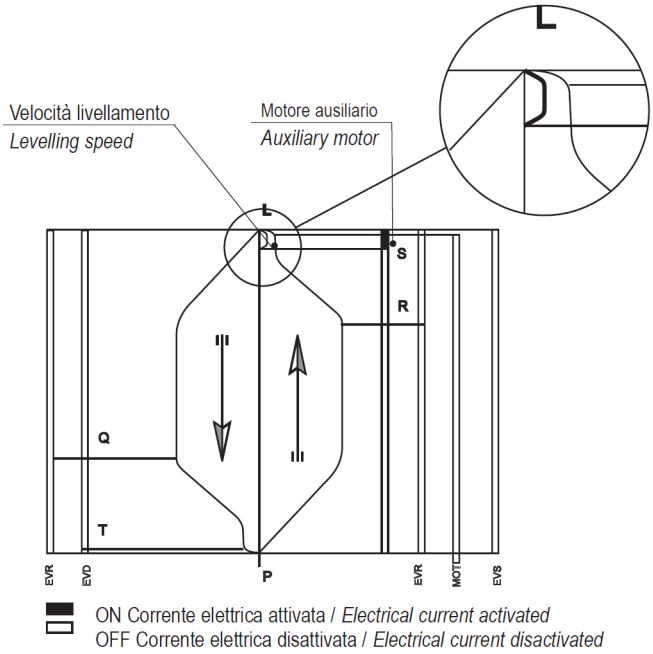
Gear pump delivery: 20 l/min (50 Hz).
Electrical motor power: 3HP – 2,2 kW – 1450 g/min – 50 Hz.
Levelling speed of the rods: see table below.

ROD DIAMETER		110	120	130	150	180	200	230
ROD SPEED m/s	50 Hz	0,033	0,028	0,024	0,018	0,012	0,010	0,008
	60 Hz	0,040	0,034	0,029	0,022	0,014	0,012	0,010

4.6.2 SCHEME OF CAR SPEED DURING MICROLEVELLING

- During the upward travel the motor – pump group is connected.

- In the moment of stop during the upward travel, the motor – pump group is stopped.

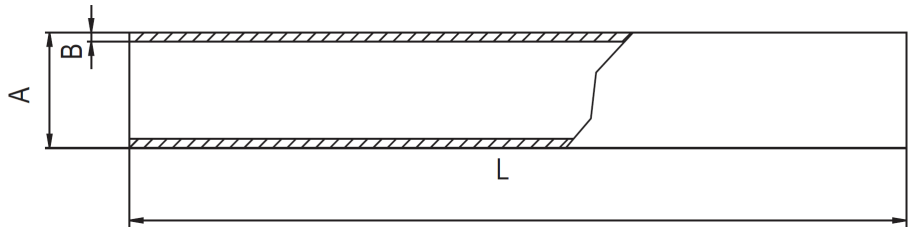


ELECTRICAL CONTROL

The microlevelling control is operated through a contact set in the lift shaft, a few centimeters below the floor level which is activated by the car downward movement, once the car has been loaded. The contact positioned in the shaft, has to electrically operate a relay switch which feeds the three – phase motor of the microlevelling. This action has to cease once the cabin has reached the floor level.
Note: the electrical control switch board is not supplied with the microlevelling device.

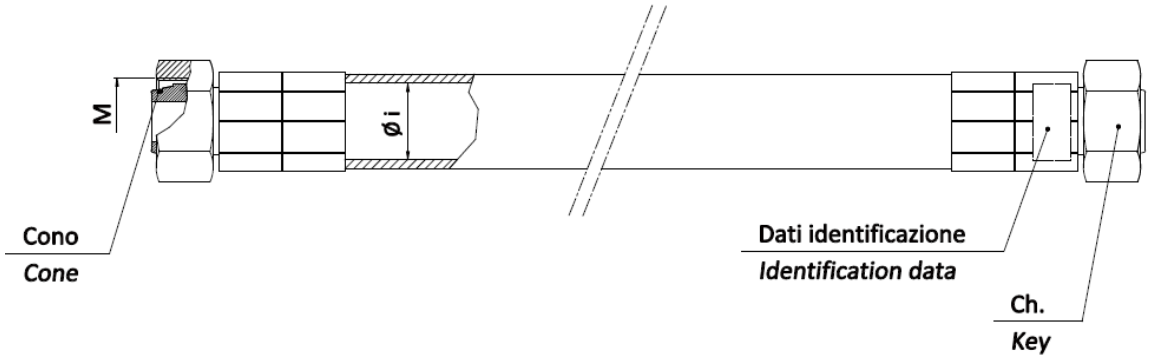
4.7 CONNECTION PIPES

4.7.1 STEEL PIPE St 37.4



TYPE	A [mm]	B [mm]	L [m]	FITTINGS	OIL DELIVERY	MAX. PRESSURE
6 x 1	6	1	5 ÷ 6	1/8 “	only VP connection	45 bar
22 x 1,5	22	1,5	5 ÷ 6	3/4 “	8 ÷ 42 l/min	45 bar
35 x 2,5	35	2,5	5 ÷ 6	1 1/4"	55 ÷ 150 l/min	45 bar
42 x 3	42	3	5 ÷ 6	1 1/2"	180 ÷ 300 l/min	45 bar
N° 2:42 x 3	42	3	5 ÷ 6	1 1/2"	360 ÷ 600 l/min	45 bar

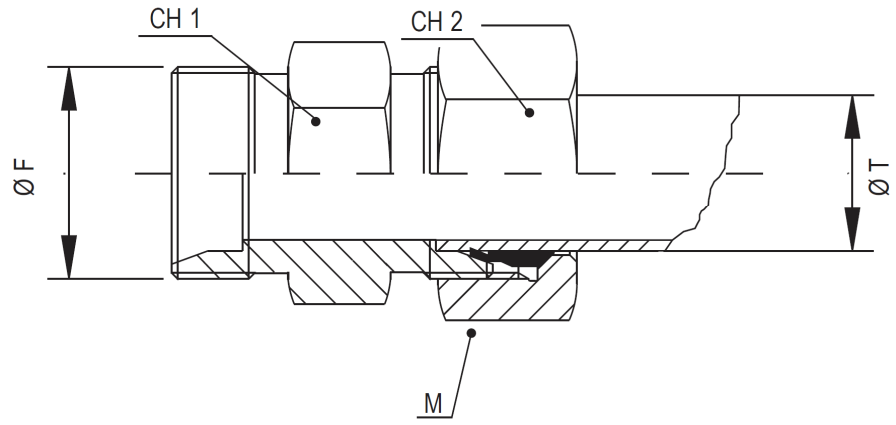
4.7.2 FLEXIBLE HOSE



TYPE	Øi [mm]	CONE	M	CH [mm]	APPLICATIONS	MAX. PRESSURE	CURVE RAY [mm]	NOTE
G1/4	6	24°	M12 x 1,5	14	only VP connection	45 bar	100	Not representative drawing. Fittings 2x G1/8
G3/4	19	24°	M30 x 2	32	8 ÷ 42 l/min	45 bar	240	-
G1 1/4	31,8	24°	M45 x 2	50	55 ÷ 150 l/min	45 bar	420	-
G1 1/2	38,1	24°	M52 x 2	60	180 ÷ 300 l/min	45 bar	500	-
G2	50,8	60°	2”	70	360 ÷ 600 l/min	45 bar	660	-

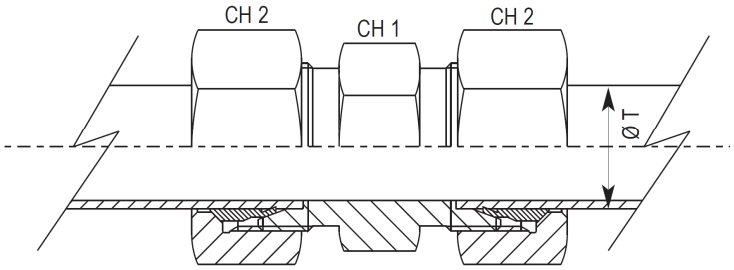
4.8 FITTINGS

4.8.1 END STRAIGHT FITTING

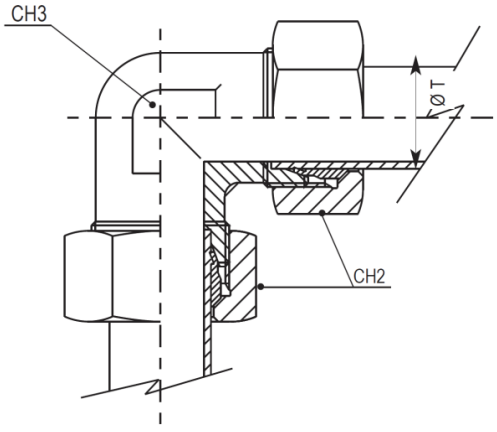


ØF	ØT [mm]	CH1 [mm]	CH2 [mm]	M	APPLICATIONS
G1/8	6	14	14	M12 x 1,5	Rupture valves connections for installation with two cylinders
G3/4	22	32	36	M30 x 2	Valvole NL 8 ÷ 42 l/min – FR 3/4” – VP HC 34
G1 1/4	35	50	50	M45 x 2	Valvole NL 55 ÷ 150 l/min – FR 1 1/4” – VP 114
G1 1/2	42	55	60	M52 x 2	Valvole NL 180 ÷ 300 l/min – FR1 1/2” – VP 112

4.8.2 LINE – STRAIGHT FITTING

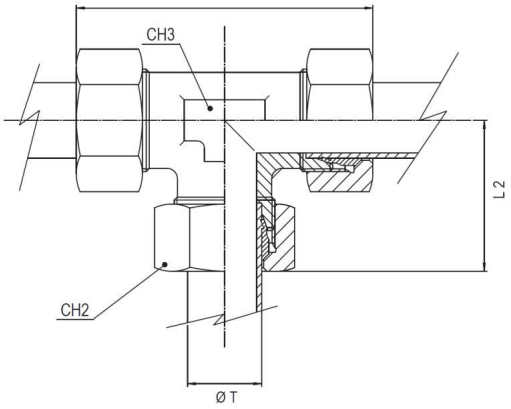


4.8.3 LINE – ELBOW FITTING



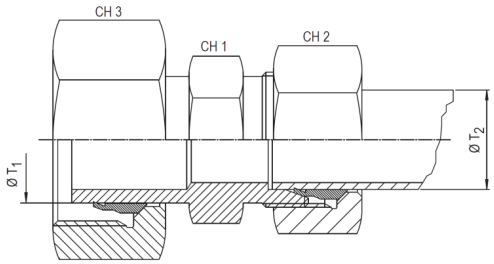
ØT	CH1 [mm]	CH2 [mm]	CH3 [mm]	APPLICATIONS	MAX. PRESS [bar]
6	12	14	-	VP connection	45
22	32	36	27	8 ÷ 42 l/min	45
35	46	50	41	55 ÷ 150 l/min	45
42	55	60	50	180 ÷ 300 l/min	45

4.8.4 THREE – WAY FITTING

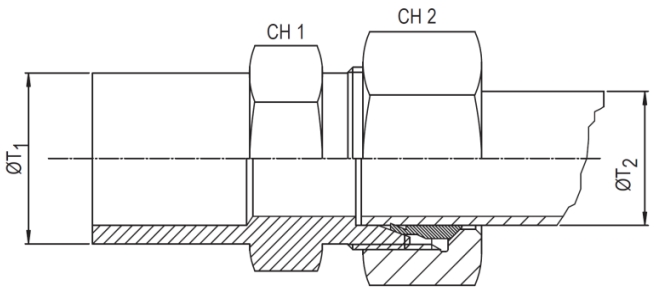


ØT [mm]	L1 [mm]	L2 [mm]	CH2 [mm]	CH3 [mm]
22	88	44	36	27
35	112	56	50	41
42	126	63	60	50

4.8.5 COMPLETE LINE REDUCTION FITTING



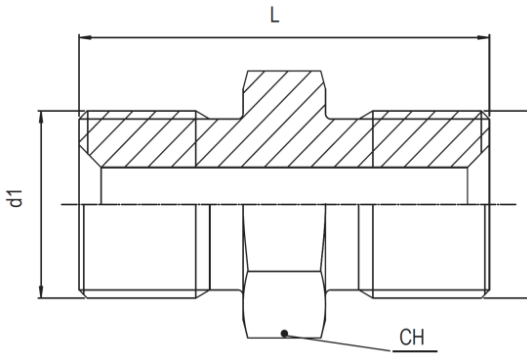
4.8.6 STRAIGHT – SHANK LINE REDUCTION FITTING



ØT1 [mm]	ØT2 [mm]	CH1 [mm]	CH2 [mm]	CH3 [mm]
35	22	36	36	50
42	35	46	50	60

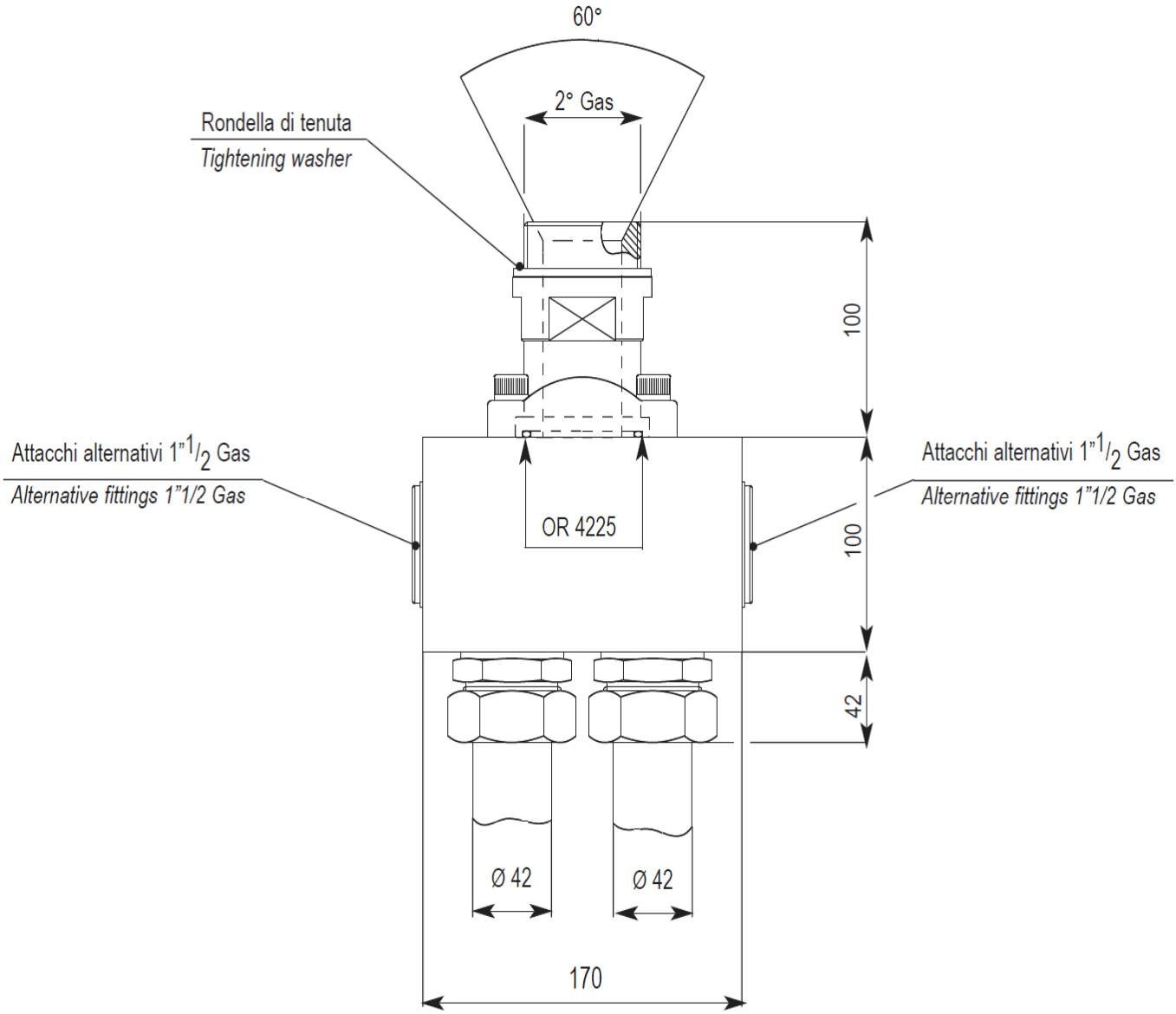
4.8.7 MALE – MALE FITTING (ADAPTER)

The male – male fitting 2” is used to connect the pump unit to the cylinder with a flexible hose 2”.



d1 = d2	ANGLE (FITTING)	CH [mm]	APPLICATIONS
3/4”	60°	32	Valves NL HC 01 – 02 /FR 3/4” /VP HC - 34
2”	60°	65	NL valves NL 360 ÷ 600 l/min / FR 2” – VP 200

4.8.8 SPECIAL THREE – WAY FITTING: 2” + Ø42 + Ø42



APPLICATION

- Connection of pump units with valves 2” to two tandem cylinders.
- Connection of pump units with valves 2” to a cylinder, through two parallel lines.

4.9 MRL CABINETS

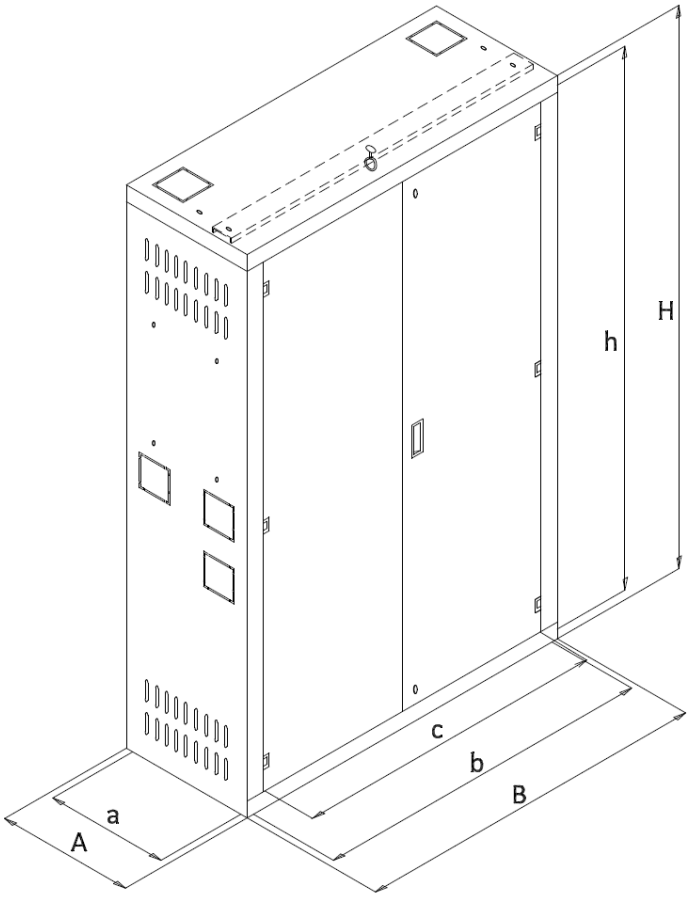
4.9.1 RANGE AND OVERALL DIMENSIONS

OMARLIFT offers to its Customers a wide range of cabinets MRL (machine room less) for installations. They are provided double door with lock, in plate painted RAL 7032, with handling hook, internal light, screws and bolts, standard packaging, assembling instruction and risk analysis.

The cabinets are designed taking into consideration all the possible hose exits in order to satisfy the Customer's needs.

For requests as lead time and special cabinets please contact OMARLIFT Sales Department.

The cabinets are according to the existing Lift Directive, only if the installation of electrical devices is properly done by a specialized installer.

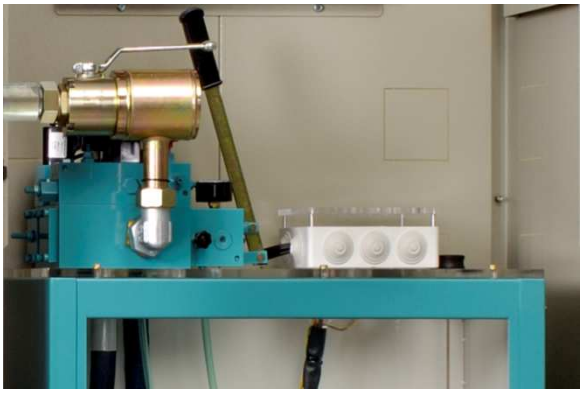
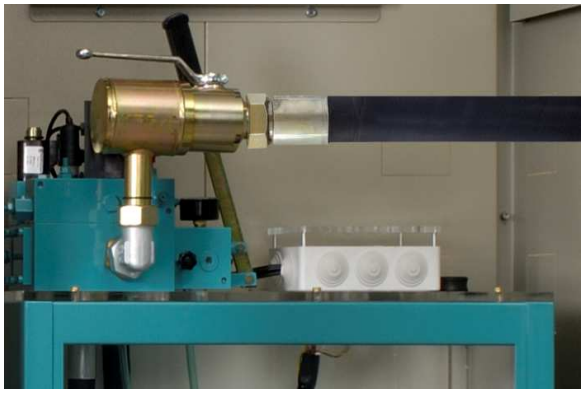
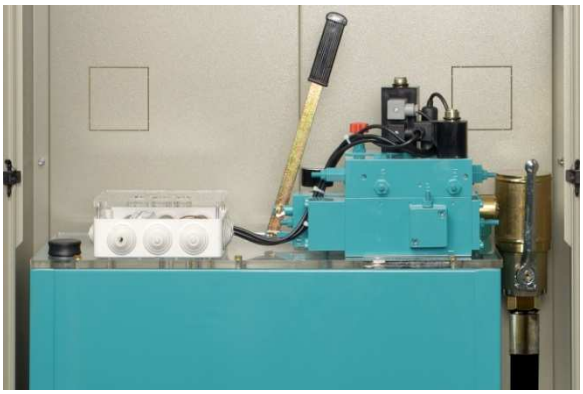
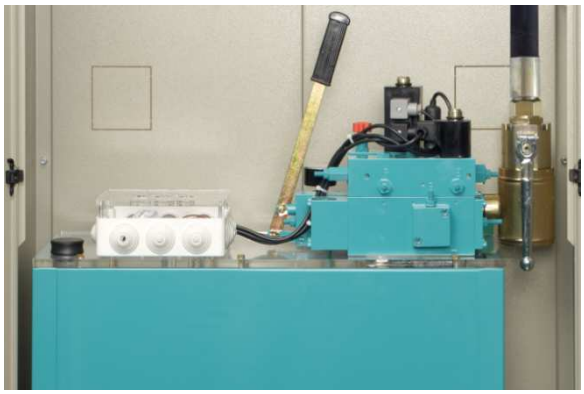
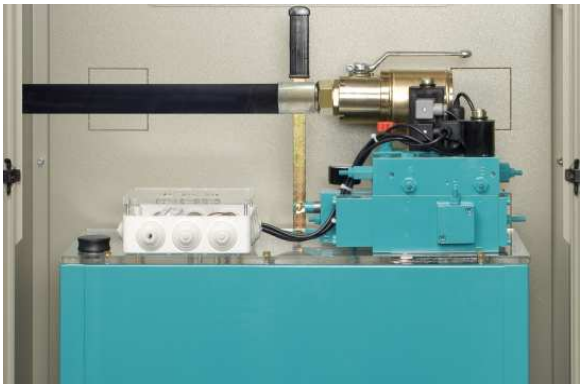
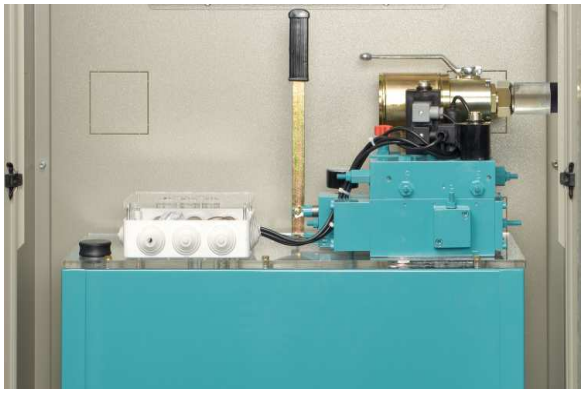


CODE	EXTERNAL DIMENSIONS (mm)			INTERNAL DIMENSIONS (mm)			ACCESS (mm)	RANGE		
	A	B	H	a	b	h	C	TANK	MAX. MOTOR	MAX. PUMP
8H202430	400	900	2100	350	890	2060	840	110/S – 135/S	20 HP	150 l/min
8H202431	580	1120	2100	530	1110	2060	1060	210/S 320/S	25 HP 50 HP	210 l/min 380 l/min
8H202438	1250	1900	2200	1200	1890	2160	1820	680	80 HP	600 l/min

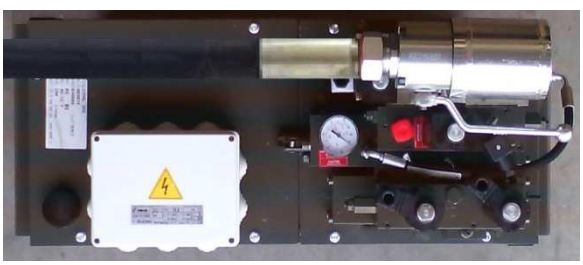
4.9.2 CABINET LAYOUT CONFIGURATIONS

OMARLIFT cabinets are designed with many openings customizable. Here below some indicative layout considering the system configuration.

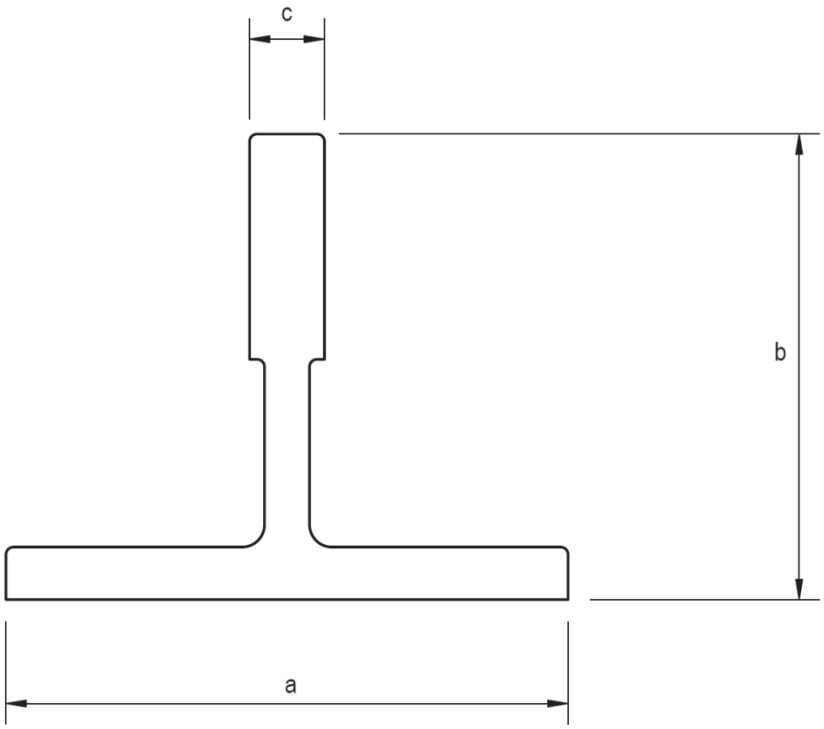
PUMP UNIT WITHOUT HDU

PUMP UNIT WITH HDU INTEGRATED




4.10 LIFT GUIDE RAILS



GUIDE TYPE	a [mm]	b [mm]	c [mm]
GL445	45	45	5
GL505	50	50	5
GF765	70	65	9
GL708	70	70	8
GF770	70	70	9
GF762	75	62	10
GL809	80	80	9
GF829	82	68	9
GF890	89	62	16
GF975	90	75	16
GF125	125	82	16
GM890	89	62	16
GM975	90	75	16
GM125	125	82	16
GM127 – 2	127	89	16
GM127 - 3	127	89	16

4.11 PACKAGING

4.11.1 CYLINDERS PACKAGING

OMARLIFT cylinders are supplied with standard package composed by protective oil on the cylinder head and plastic cover on the rupture valve. Upon specific request of the Customer it's possible to use optional packaging like the wooden supports (available also in treated wood to satisfy the sanitary standards in force in some countries) and the multiple packaging on saddles.
For special packaging, please contact OMARLIFT Sales Department.

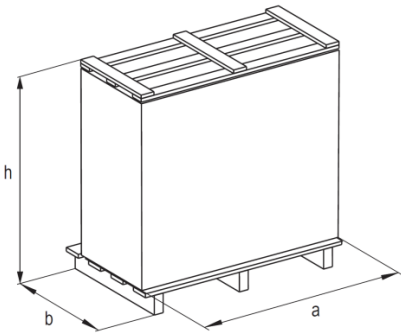
Pic. 2 - Standard packaging: the pieces are not part of the packaging of the individual cylinder.

Pic. 3 – Multiple package

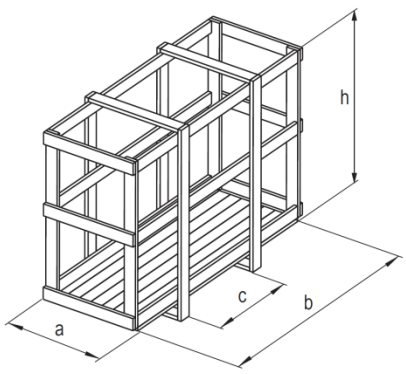
4.11.2 PUMP UNITS PACKAGING

OMARLIFT pump units are supplied with standard package composed by thermo–shrinking plastic.
The shut off valve, the hand pump lever, the PVC pipe for oil leakage, the anti-vibration pads and the instruction manuals are in a cardboard box on the tank.
Upon specific request of the Customer it's possible to use optional packaging like the pallet with cardboard cover (pallet in wood or treated wood to satisfy the sanitary standards in force in some countries) and the wooden cage.

For special packaging please contact OMARLIFT Sales Department.



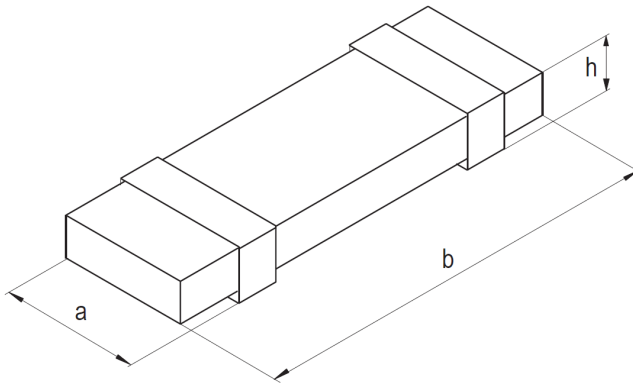
Pump unit dimensions with pallet + cardboard			
Pump unit type	a	b	h
110/S	830	350	1100
135/S	830	350	1300
210/S	950	450	1220
320/S	1130	530	1300
450	1200	800	1430
680	1400	860	1500



Packed pump unit dimensions with cage				
Pump unit type	a	b	c	h
50/S	400	700	>650	900
110/S	400	880	>650	1200
135/S	400	880	>650	1400
210/S	500	1000	>650	1250
320/S	560	1120	>650	1530
450	800	1180	>650	1500
680	920	1430	>650	1820
HE 110	400	880	>650	1400
HE 135	400	880	>650	1450
HE 210	500	1000	>650	1420
HE 320	560	1120	>650	1530

4.11.3 MRL CABINETS PACKAGING

The machine room cabinets are supplied with a standard packaging in cardboard and two wooden supports. Upon specific request from the Customer, it's possible to supply a maximum of four cabinets piled on a pallet.
For special request contact the OMARLIFT Sales Department.



Standard package for Cabinet

Dimension of package with wooden supports			
Pump unit type	a	b	h
110/S	550 mm	2100 mm	220 mm
210/S	700 mm	2100 mm	220 mm
50/S	700 mm	2100 mm	220 mm
1300/S	910 mm	1600 mm	130 mm
1550/S	910 mm	1600 mm	130 mm

Package dimensions subject to variation

Multiple package on pallet

4.12 OIL CONTAINMENT TANK

The standard EN 81-20 (paragraph 5.2.1.9) requires that “For hydraulic elevators the space where is placed the pump unit and the pit must be designed in such a way that it is waterproof so all the fluid contained in the pump unit placed in such areas is retained in case of loss”.

The choice is relevant to the Constructor of the complete installation, considering the structural characteristics of the pit. OMARLIFT provide on request oil containment tank to satisfy the statutory standard, with a capacity for all oil of the pump unit, except the oil for charging the pipes and the cylinder. In alternative, "first aid" solutions of low height and more practical, but that can contain a partial capacity, are available.

Below are shown the codes of oil containment tank and the main dimensions.
The last column gives an indication of the application where each oil containment tank is dedicated.

CODE	MAIN DIMENSIONS	APPLICATION
8H102516	Oil containment tank 280 x 600 x 40	50/S
8H102592	Oil containment tank 340 x 740 x 40	60/S - 110/S - 135/S
8H102593	Oil containment tank 340 x 740 x 500	60/S - 110/S - 135/S
8H102850	Oil containment tank 380 x 650 x 40	C40 - C50
8H102910	Oil containment tank 380 x 650 x 260	C40 - C50
8H102517	Oil containment tank 500 x 1000 x 40	210/S - 320/S
8H102591	Oil containment tank 500 x 1000 x 500	210/S - 320/S
8H102607	Oil containment tank 750 x 1050 x 40	450
8H102599	Oil containment tank 750 x 1050 x 500	450
8H102606	Oil containment tank 850 x 1300 x 40	680
8H102832	Oil containment tank 850 x 1450 x 500	450 + microlev
8H102486	Oil containment tank 950 x 1000 x 500	320/S + microlev
8H102849	Oil containment tank 950 x 1400 x 500	680
8H102598	Oil containment tank 1150 x 1100 x 500	450 + microlev
8H102864	Oil containment tank 1200 x 1400 x 500	680 + microlev
8H102685	Oil containment tank 1300 x 1500 x 150	680+H_2O cooling+microlev
-	On request	900 - 1000 - “Bassotto”

5 ASSEMBLING – SETTINGS – SERVICING

5.1 GENERAL INFORMATION

5.1.1 INTRODUCTION

The assembly, installation, put into action and maintenance of the hydraulic lift have to be carried out only by trained staff. Before starting whatever work on the hydraulic components, it is necessary that the staff read the indications of the Operating instruction for hydraulic components (D840M), which must be kept in a safe and accessible place. For advises on liability and guarantee, safety and cleaning refer to the above mentioned manual, to the points 1.2, 1,3 and 1.4.

5.1.2 INSTALLATION OF CYLINDERS AND PUMP UNITS

For the installation or replacement of the hydraulic installation components, these points have to be followed:

- Use only the material advised by OMARLIFT and the original OMARLIFT spare parts.
- Avoid sealing materials such as silicone, plaster or hemp, which could penetrate the hydraulic circuit.
- If using pipes bought from other supplier, choose only the ones responding to the safety measures, in force and according to the pressure of the installation. Note that the use of iron pipes only to connect the pump unit to the cylinder can transmit and increase the noise.
- Install the flexible hoses with the right bending radius suggested by the manufacturers and avoid the use of hoses longer than necessary.

5.1.3 MAINTENANCE

During the periodical works of maintenance besides normal tests, it should be remembered that:

- The damaged pipes have to be replaced immediately.
- Get rid of oil leakage and its causes.
- The possible spilled oil has to be collected, so that any leakage can be easily detected.
- Be sure that there are no unusual and excessive noises in the pump, the motor or the suspensions. In case get rid of them.

5.1.4 ANTI – POLLUTION MEASURES

Possible spilled oil from the circuit during repair operations has not to be spread in the environment, but has to be promptly collected with cloths or sponges and disposed carefully in proper containers. In case of oil replacement, also the waste oil has to be disposed in proper containers.
For the disposal of oil and cloths containing oil contact specialized companies and follow the regulations in force in the country of operation. Concerning the rules against water pollution act according to the national rules.

5.1.5 CONTROL OF THE SUPPLIED MATERIAL

When the material is delivered, before taking it on the charge check that the goods correspond to the list reported in the delivery document and to the requested order, taking into consideration also OMARLIFT sales condition.
The main supplied components have their own adhesive plate containing all the data needed to identify them:

- Cylinder: adhesive plate on the cylinder head.
- Rupture valve: adhesive plate fixed on the valve side.
- Pump unit: adhesive plate fixed on the tank cover.
- Flexible hose: test date, test pressure and manufacturer name engraved on the fitting and in addition the test certificate in the plastic bag attached to the hose.

5.1.6 FEATURES OF THE MACHINE ROOM

Before installing:

Make sure that the shaft, pit, head and machine room correspond to the project data and respond to the regulations in force, moreover.

Make sure that access ways allow the passage of the different components to be installed.

Make sure that the bottom of the pit is clean, dry and waterproof.

Make sure that the shaft is ventilated and illuminated sufficiently.

Make sure that the machine room has the access door with opening towards the outside, that is if possible noise – proof, well ventilated and its temperature preferably between 10 and 30° C.

5.2 CYLINDERS INSTALLATION

5.2.1 GENERAL INFORMATION

The cylinder rod is blocked against the cylinder with a stirrup so that it can not get off during any moving or transport.
In the cylinder in two pieces, the joints are protected by two protection flanges, blocked against the cylinder flanges with two screws. The two protection flanges are needed to keep the two parts of the rod blocked, avoiding water and dirt from getting inside it.

5.2.2 CYLINDERS TRANSPORT AND STORAGE

- The loading and unloading on the means of transport have to be made with proper hoists or clamp trucks.
- If the cylinder is vertically lifted, the rod has to be turned upward and the ropes for the lifting have to be fixed on the cylinder and not on the rod (see Pic. 4).
- If the cylinder is lifted with fork lifts, the arms have to lift the cylinder in the middle, keeping them as far as possible.
- If the cylinder needs to be rolled, make it troll very slowly to avoid bruises on the rod.
- Lay the cylinders preferably horizontally on the truck floor and avoid leaning the cylinder against the cabin roof in order to prevent that vibrations during the transport cause bruises on the rod.

Pic. 4 Cylinder lifting

- Before storing, check that the protection packaging is in a perfect state of preservation.
- After having positioned the cylinders on proper supports, block them in a way that they cannot fall.
- If cylinders in one piece have to be stored for a long time, it is better to fill them with anti – corrosive oil. Since the oil volume changes according to the temperature, it is better not to fill the cylinders completely.
- If cylinders in two pieces have to be stored for a long time, check that the flanges closing the joint close hermetically and that the rods are well greased. Keep both the closing flanges and the rod which comes out from the cylinder well covered with grease.
- Before putting the installation into action, replace the oil used for the filling up and remove the excessive grease.

5.2.3 THE CYLINDER

The cylinder serial number is on a sticker on the cylinder head on the same side where the rupture valve is assembled. This number appears also on the identification plate together with the remaining data of the cylinder.

- All the cylinders are tested in the factory at two levels of pressure to guarantee the sealing of the seals and the sealing of the welding.
- Telescopic cylinders have to undergo not only the pressure tests but also tests regarding the synchronization and the travel length of the different stages.
- The oil used for tests is taken out of the cylinder, the small quantity remaining inside acts as a protection against rust for a long period of time. If thee cylinder remains on the site for a long time, it is better to control the state of preservation of the rod, cleaning and polishing it, if necessary.
- The oil inlet (and therefore the rupture valve) can be at the top or at the bottom, the oil inlet has to be decided when ordering.
- The rupture valve, assembled directly on the cylinder, can be oriented in four directions whit 90° intervals.
- If in the lift shaft brickwork, painting or welding has to be carried out, protect the cylinder head with grease and cloths. Clean carefully before putting the installation into action.
- The cylinder has to be assembled perfectly perpendicular. When the rod has reached its maximum length out of the cylinder it has to be perfectly parallel to the guides.
- All the cylinders have a line elbow fitting on the head. This fitting allows the collection of the oil lost by the cylinder, it has to be screwed in the proper threaded hole on the highest part of the cylinder and then connected through a PVC pipe to a small tank for the oil recovery. In this way oil loss can always be detected.

5.2.4 INSTALLATION OF INDIRECT SIDE ACTING CYLINDERS IN ONE PIECE

The indirect side acting cylinders roped 2:1 are supplied without plates and are at one only stage assembled on a small pillar (or same system for the installation with two cylinders).

- The pillar is fixed at the bottom to the beam of the pit and at the top of the wall or to the guides with adjustable fixing.
- The cylinder lays on an adjustable support assembled on the top of the pillar. Between the pillar and the cylinder, a disk of antivibration insulating material can be placed.
- The cylinder head is fixed through a tie at the wall or at the guides in an adjustable way. Other middle fixing points can be made according to the cylinder length. At this purpose follow carefully the installation project.
- In order to obtain the maximum noiselessness, always use the rubber between the tie and the cylinder neck.
- The pulley assembled on the rod head has to be well guided, without excessive clearances on the guides or forcing along the travel.

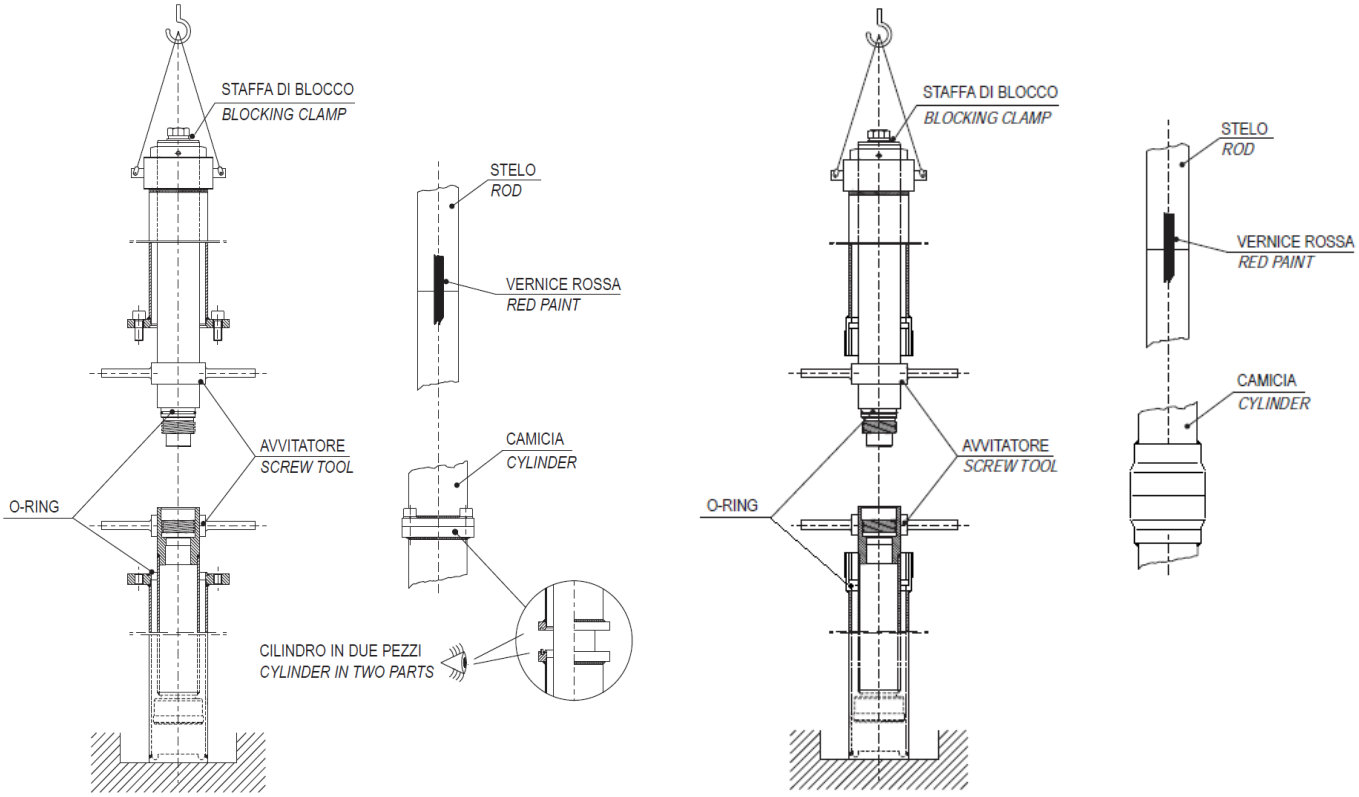
5.2.5 INSTALLATION OF INDIRECT SIDE ACTING CYLINDERS IN TWO OR MORE PIECES

- Cylinder in two (or more) pieces have a rod with a threaded joint, while the cylinder has a joint with a squared flange.
- The upper half on the cylinder in two pieces has a rod which is longer than the cylinder, so it is possible to fix the screwer to the rod without disassembling the cylinder.
- The two joints of the cylinder in two pieces are hermetically closed by two metal hoods which act as a protection and packaging during the transport.
- Special screwers or the other tools, insulated with rubber, have to be fixed to the lower part of the rod, laying horizontally, before putting it in a vertical position. It's necessary, after having remove the protection hoods, to put some rubber stripes between the rod and the cylinder, in order to avoid damages to the rod. These stripes have to be fixed well to the screws of the flange and have to be removed just before closing the square flanges of the cylinder.

Follow the next operating instructions for the assembling of the two pieces:

- Put the lower part of the cylinder in a perfect vertical position and fix it, after having blocked the rod with a screwer.
- Block the rod of the upper half with a screwer or with another tool insulated with rubber, without making it come out of the head which contains the seals. The block stirrup of the rod has to be removed only when the operation has finished.
- Lift the upper half of the cylinder with an hoist, fastening it at the two holed plates which are welded on the head. Perfectly align the upper half with the lower half.
- Remove grease and clean the male and female threads, avoiding that the solvent contacts the OR of the joint.
- Control carefully that there are no bruises neither on the threads nor on the joint. If necessary, get rid of them.
- Control that the OR of the joint is not damaged and is well greased.
- Lower the upper half on the cylinder and slowly approach the threads without harsh movements. Check the alignment and completely screw without using the thread – locking liquid. If you notice any difficulty with screwing, unscrew immediately, control the threads and try again.
- After having completely screwed the two halves, unscrew by 4 – 5 turns, apply the thread – locking liquid on the screw (not on the OR), quickly screw again, checking that the red paint signs are aligned (max tolerance 4 - 5 mm).
- Remove the screwers and control by hand that the joint of the rod is perfect all around, without bruises and steps. If necessary, smooth with fine abrasive paper (grain 400-600).
- Control that the OR in the lower flange is perfect and lays in its seat. Clean the two flanges.
- Pull the two square flanges closer, paying attention to match the pin and the hole. Then screw the four screws that block the flanges, tighting crosswise.
- In case of three pieces cylinders, we advise to proceed as follows:
- In the first step, assemble the cylinder lower party (1) with the intermediate one (2), considering these two parts as being one cylinder in two pieces ad following the indications mentioned in the previous points. To facilitate this operation, the intermediate part jacket can be completely unthreaded and put back after having assembled the first two parts.

- In the second step, assemble the upper part (3) with the two ones previously connected (1) + (2). Even in this phase, we can proceed like for the two pieces cylinder assembling and follow the same indications mentioned above.



5.2.6 INSTALLATION OF DIRECT SIDE ACTING CYLINDERS STANDARD AND TELESCOPIC

The direct side acting cylinders roped 1:1 are at one stage or telescopic at two or three stages (the same system with two cylinders) and are supplied with a bottom support plate and a top oscillating one.

- The cylinder lays directly on the pit bottom through the base plate. The rod head is equipped with a spherical joint to hook the frame in a flexible way so that no bending stress is transmitted. The spherical joint has to be greased before fixing the plate to the frame.
- In the telescopic cylinder case for buckling safety, it can be necessary to install intermediate guide arms, in that case the telescopic heads are equipped with linking for the guide arms, which anyway, has to be made and placed by the installer. Check the project and operate according to it.

5.2.7 INSTALLATION OF DIRECT CENTRAL ACTING CYLINDERS STANDARD AND TELESCOPIC

The underground direct central acting cylinders are supplied with an upper plate with spherical joint and with a middle support plate which is articulated in case of telescopic cylinders. The cylinder part laying under the middle plate is protected by a special anti – corrosive black paint.

The articulated plates have to be greased in their moving parts before being installed.

Before installing the cylinder, it is better to control the dimensions of the hole which is going to contain the cylinder.

Moreover, the cylinder has to be protected against corrosion and has to be installed inside a protection tube. Only when the installation is perfectly working, the cylinder could be rammed.

The cylinder positioning has to be made according to the project dimensions.

To position the cylinder perfectly perpendicular and parallel to the guides its suggested to operate according to the following directions:

a) Normal direct central acting cylinders at one stage: draw the nylon wire, which is inside the rod, perfectly perpendicular out of the threaded hole. Check that it comes out perfectly at the center and is parallel to the guides.
b) Direct central acting telescopic cylinders at two or three stages: the intermediate oscillating plate permits the automatic alignment of the cylinder to the guides, it is anyway necessary that the ground hole diameter is larger than the external cylinder one and that the base plate joint is well greased. With these premises the underground part will align automatically to the rods when the cylinder will push the car.

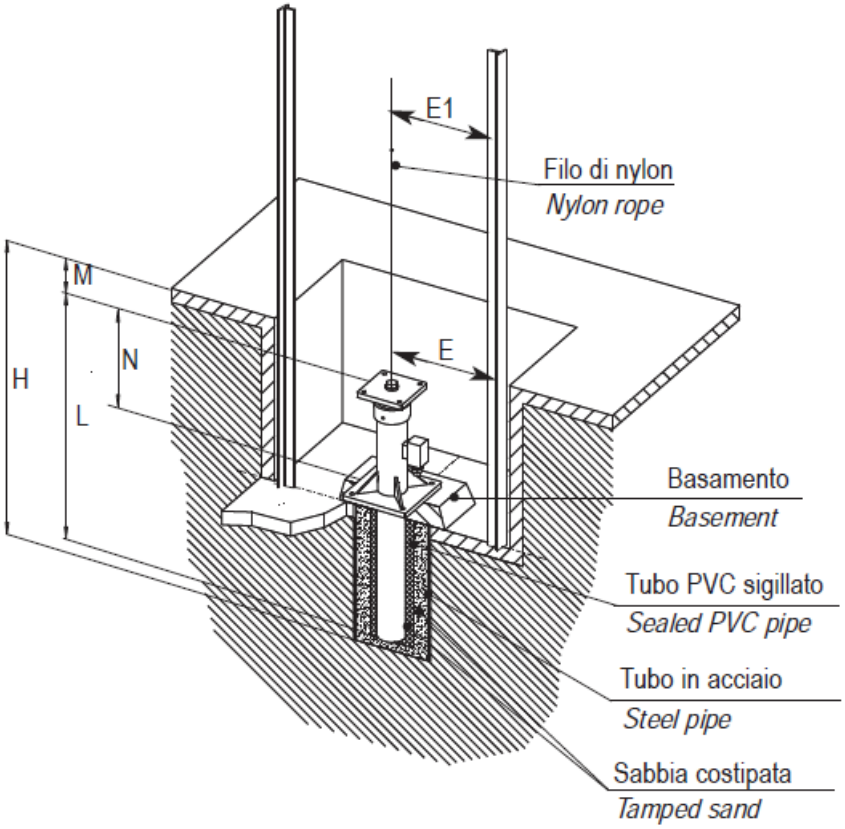
L = Length of completely closed cylinder.

N = Value for the central direct acting cylinder as per Omar catalogue.

M = Thickness of the car bottom, car frame + lower extra stroke.

H = Pit total depth + ground hole > L + M.

E1 = E = Value corresponding to the oscillating plate level.



Example of an underground direct acting cylinder

5.3 PUMP UNITS INSTALLATION

5.3.1 GENERAL INFORMATION

OMARLIFT hydraulic pump unit is composed by the following components: tank, valve block, submerged motor – pump block, shut off valve, electrical connection box and other accessories upon request.
The pump unit is protected by a plastic cover and can be laid on a wooden support. If requested the pump unit can be packed with cardboard or in a wooden cage.

5.3.2 PUMP UNITS TRANSPORT AND STORAGE

Load and unload the pump units using forklifts. The pump units are lifted in two ways. the 110/S, 210/S e 320/S types have to be slung passing the ropes under the handles. The models 450, 680 and specials, passing the ropes through the proper eyebolts as shown in the Pic. 5.

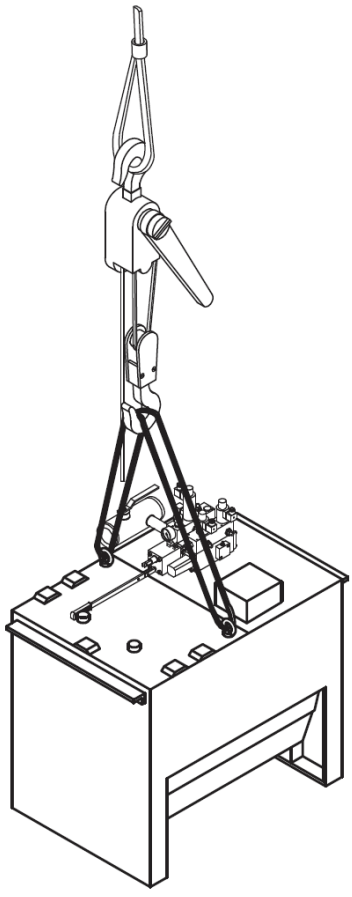
⚠ Do not use different fixing hoses than those arranged for eyebolts.

The pump units cannot be placed on each other.

Store the pump units in a dry place with a temperature between 5 and 30° C.

Control the protection packaging and replace it, if necessary.

If the pump units have to be stored for a long time, it is better to fill the tank with oil, at least until the motor is covered.



Pic. 5 Lifting with eyebolts

5.3.3 PUMP UNIT

The serial number of the pump unit is reported on the adhesive plate on the tank cover.

- Check the preservation status of the pump unit, clean and dry the inside of the tank if needed.
- All the pump units and the shut – off valves are tested and adjusted before the delivery. Therefore, they can work immediately, without any further adjusting. When the installation has been finished, the oil filled and the air purged, it will be possible to readjust the low speed and the deceleration to optimize the installation working.
- The pump unit room has to be located as close as possible to the lift shaft, has to be big enough, with an almost constant temperature, possibly heated in winter and ventilated in summer. If distances are bigger than 8-10 meters, take into consideration the pressure loss along the main pipe.
- Avoid noise transmission by using anti – vibration pads under the tank and a flexible hose for the connection of the pump unit to the cylinder.
- The tank is equipped with handholds to be displaced manually and to be lifted with an hoist.
- For the hydraulic connection follow the indications in paragraph 5.4 of this catalogue.
- Fill the tank with new and good quality oil. The oil quantity should be almost enough to cover the motor when the cylinder is completely out, while when the cylinder is closed the level should be maximum 8 – 10 cm under the cover.
- For the electrical connection follow the indications in paragraph 5.6 of this catalogue.

5.4 HOSES AND HYDRAULIC CONNECTIONS

5.4.1 GENERAL INFORMATION

For the connection of the cylinder to the pump unit it is possible to use either cold drawn steel tubes, normalized and pickled, special for hydraulic circuits, or flexible hoses tested and certified for high pressure, in alternative mixed connections. The shut–off valve can be turned to be better aligned with the pipe direction. The main oil pipe has to be as short as possible and avoid narrow bending. The use of elbow fittings has to be as reduced as possible.

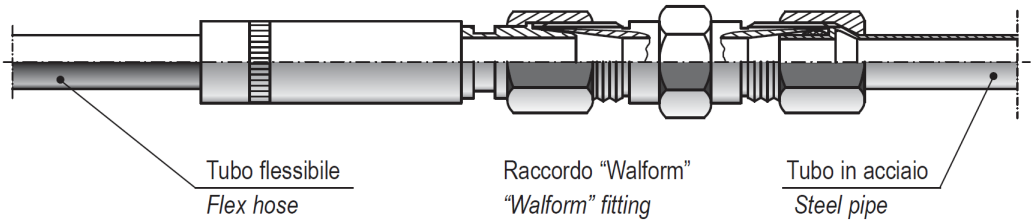
5.4.2 PIPES TRANSPORT AND STORAGE

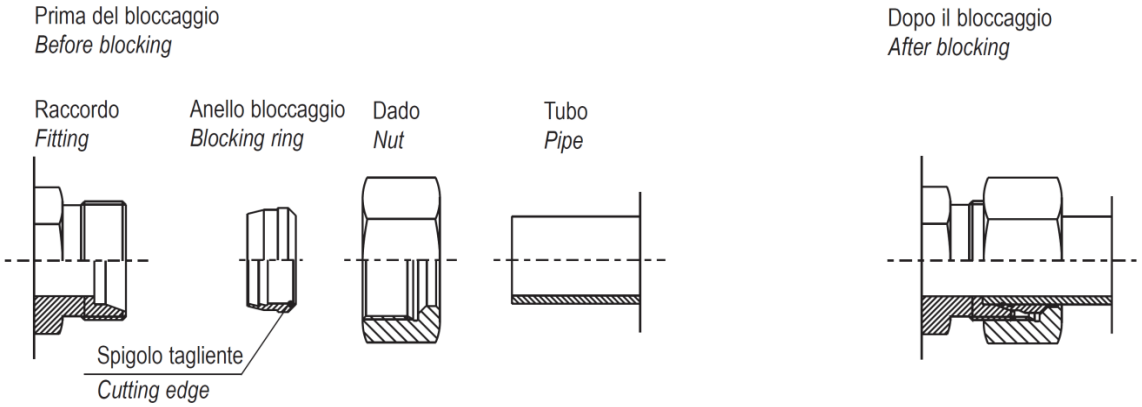
- Avoid harsh bending of the flexible hoses.
- Prevent the flexible hoses from contact with caustic essences, solvents or other chemical substances.
- Transport the flexible hoses in their original packaging.
- Avoid any kind of bending of the rigid pipes.
- Transport the rigid pipes with their caps on the ends.
- Store the pipes in a dry place, with temperature between 5 and 30° C.
- Prevent the flexible hoses from the direct sunlight or the near presence of a heating source.
- Do not keep the flexible hoses stored for more than 2 years from the test date engraved on the fitting.

5.4.3 CONNECTION OF STEEL PIPES

- Use only a cold drawn, normalized, pickled, hydraulic steel pipe in a good state of preservation. If its dimensions are not correct, it shows bruises or its too rigid, the pipe tightening can be jeopardized. Operate according to the following directions while assembling:
- Cut the pipe perfectly at 90° and get rid of cinders and dirt.
- Possible bends have to be cold – made using proper pipe bending.
- The use of flame can cause cinders inside the pipe.
- Oil the threading and the cutting ring of the fitting.
- Assemble the fitting on the pipe according to the sequence reported below, making sure that the cutting edge of the ring is turned towards the end of the pipe. Screw the nut manually.
- Push the pipe against the fitting seat and tighten the nut with power about 1 turn and a half using a key equipped with an extension so that the cutting ring engraves the pipe surface.
- Unscrew the nut and check that the cutting ring has perfectly engraved the pipe surface along the whole circumference. Makes sure that the cutting ring is blocked 5 mm from the pipe end.
- Screw definitely the nut of the fitting, tightening it well.
- Non normalized pipes are too hard and can get out of the fitting.

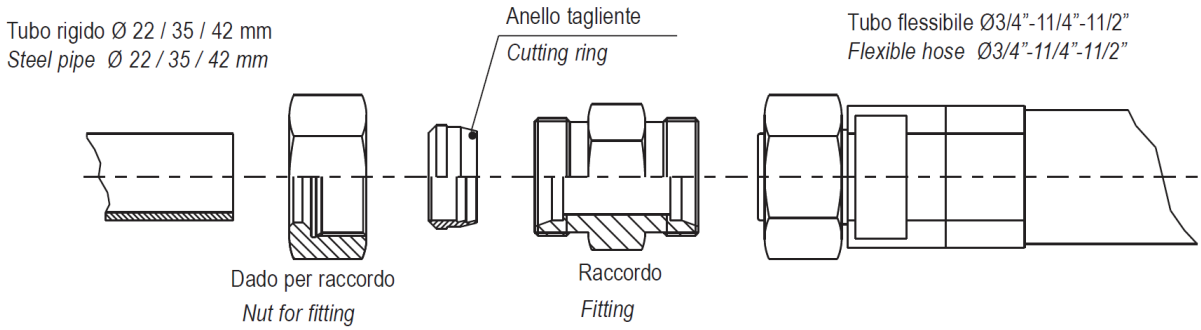
⚠ ATTENTION: the national laws of some countries do not allow the use of a joint with cutting ring. In these cases, it is necessary to use a type of fitting called WALFORM or fittings to be welded.





5.4.4 CONNECTION OF FLEXIBLE HOSES

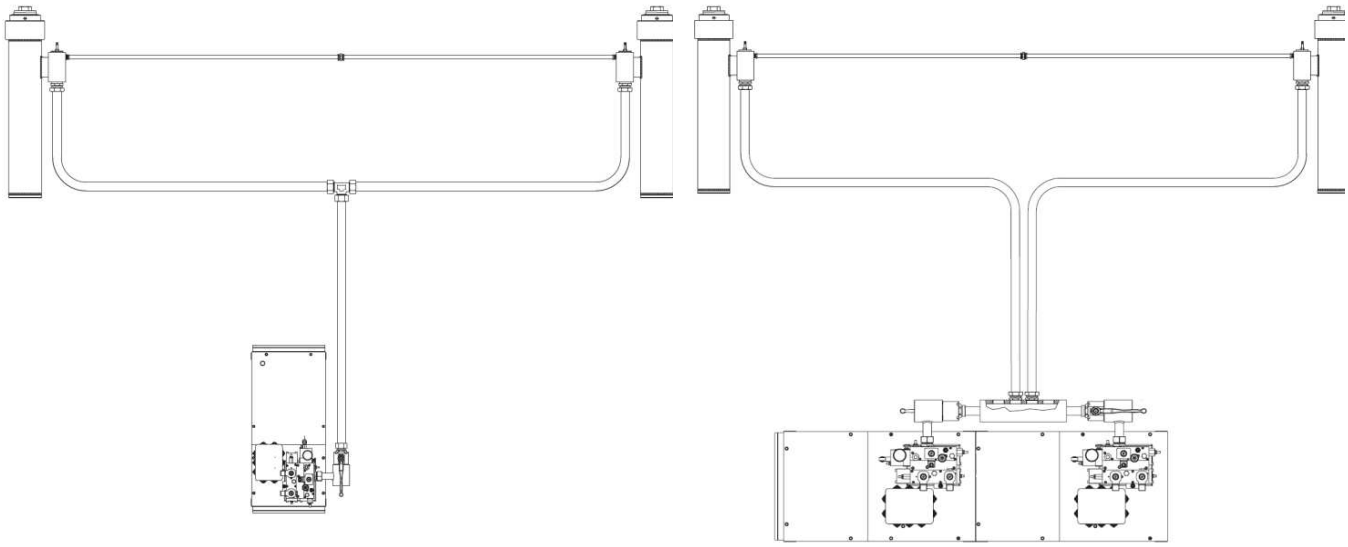
The flexible hose has not to be subject to tension, torsion and the bends have to be as wide as possible. The flexible hoses sized 3/4" – 1 1/4“ – 1 1/2 “ are equipped with revolving nut and metric threading “M” and conic end 24°. They can be connected through the same fittings employed for steel pipes. To do that, remove the revolving nut and the cutting ring from the fitting and screw the revolving nut of the flexible hose directly on the fitting. In order to improve the tightening of the flexible hoses, they are equipped with O-ring. The joint fittings 3/4” – 1 1/4 “ – 1 1/2” can also be used to connect steel pipes to flexible hoses.
Flexible hoses sized 2” are provided with end fittings having a revolving threaded nut 2” Gas and conic end 60°. They can be connected using male – male couplings 2” Gas equipped with a cone end 60°. Their connection is carried out simply by screwing the revolving nut of the flexible hose against its fitting.



For detailed information regarding the fittings, refer to the chapter 4 of the present catalogue.

5.5 CONNECTION OF INSTALLATION WITH TWO CYLINDERS

In case of installations with two cylinders, the pipes which feed the two cylinders have to have the same diameter, the same length, and follow ways as symmetrical as possible.
The rupture valves of the two cylinders have to be hydraulically connected allowing the piloting pressure balance. The rupture valves are equipped with a 1/8” threaded hole. The connection has to be done with 1/8” fittings and steel pipes with a 6 mm diameter, 1 mm thick, or with flexible hoses diameter 1/4”.



PUMP UNIT DELIVERY	VP SIZE	PIPE DIMENSIONS			THREE – WAY FITTING	FR FITTING
l/min	VP1=VP2	L3	L2	L1	-	-
55÷ 150	VP 114	Ø 35 – 1 1/4”	Ø 35 – 1 1/4”	Ø 35 – 1 1/4”	3 x Ø 35	Ø 35 – 1 1/4 “
180 ÷ 300	VP 114	Ø 42 – 1 1/2“	Ø 35 – 1 1/4”	Ø 35 – 1 1/4”	3 x Ø 42 + 2 x Ø 42/35	Ø 42 – 1 1/2 “
360 ÷ 600	VP 112	2”	Ø 42 – 1 1/2“	Ø 42 – 1 1/2“	Ø 1 1/2" + 2 x Ø 1 1/2"	2”
360 ÷ 600	VP 112	Ø 2 x Ø 42	Ø 42 – 1 1/2"	Ø 42 – 1 1/2"	Ø 1 1/2" + 2 x Ø 1 1/2"	2”

PUMP UNIT DELIVERY	VP SIZE	CONNECTION WITH 1 PIPE EACH CYLINDER	CONNECTION WITH 2 PIPES EACH CYLINDER
l/min	VP1=VP2	L1=L2	-
2 x 100 ÷ 150	2 x VP 114	Ø 35 x 2,5/1 1/4”	-
2 x 180 ÷ 300	2 x VP 112	Ø 42 x 3/1 1/2"	-
2 x 360 ÷ 600	2 x VP 200	2”	2 x Ø (42 x 3) / 2 x 1 1/2 “

5.6 ELECTRICAL CONNECTIONS

5.6.1 GENERAL INFORMATION

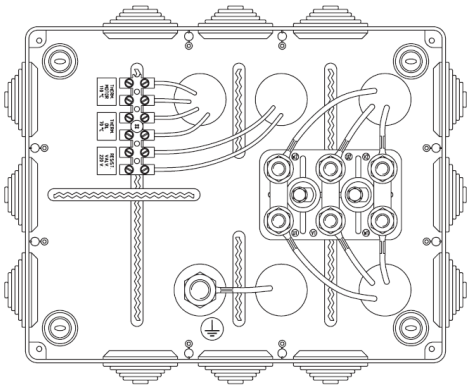
Any electrical connection has to be carried out by trained and qualified staff, according to the specific regulations.

- Before starting any kind of work, always disconnect the electrical power opening the general switch.
- The cables for the electrical power feeding must have a section sufficient for the requested power and a suitable insulation to the voltage of the electrical network. The connection cables have not to be in contact with parts subject to strong heating.
- The grounding cables has always to be connected to the bolt marked with the proper symbol.

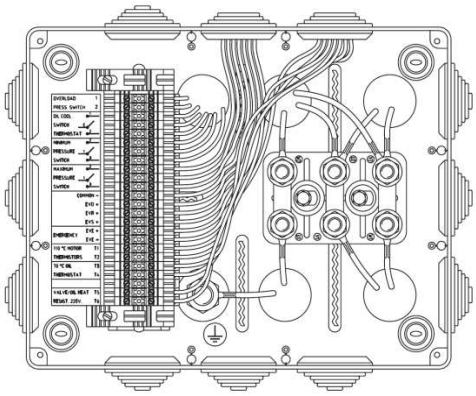
5.6.2 CONNECTION BOX

The connection box is on the pump unit cover, near the valve block.

- The box of the standard pump unit includes (see Pic. 6):
  a) Terminal block of the electrical motor
  b) Grounding bolt
  c) Thermostat for oil temperature 70° C
  d) Motor thermistors 110° C
  e) Valve heating resistor 60 W (optional)
- The pump unit box cabled (optional) includes (see Pic. 7):
  a) Terminal block of the electrical motor
  b) Grounding bolt
  c) Terminals of the thermostat for the oil cooling (optional)
  d) Terminals of the max. pressure switch (optional)
  e) Terminals of the min. pressure switch (optional)
  f) Terminals of coil EVD
  g) Terminals of coil EVR
  h) Terminals of coil EVS (optional)
  i) Terminals of coil EVE
  j) Terminals of motor thermistors 110° C
  k) Terminals of the oil thermostat 70° C
  l) Terminals of the valve heating resistor (optional)
  m) Terminals of the overload pressure (optional)
  n) Terminals EVD – HDU (if installed)



Pic. 6



Pic. 7

The images shown are indicative only.

5.6.3 ELECTRICAL CONNECTION OF THE THREE – PHASE MOTOR

The terminals of the motor are already fixed to the terminal block inside the connection box.

- In case of a direct start of the motor (or with soft - starter),the frequency and one tension of the motor have to correspond to the frequency and tension of the electrical power network.
- The connection bands on the terminal block have to respect the diagram appearing on the motor plate or the directions of the table. (see Pic. 8).
- In case of a soft – starter start, follow the directions of the manufacturer.
- In case of a star – delta start, the lower tension of the motor has to be equal to the network tension. Frequency has to be equal to the network frequency.
- In case of a star – delta start, the connection bands in the terminal block have to be eliminated (see Pic. 9).

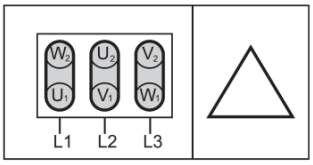
DISPOSITION OF TERMINAL CONNECTION BANDS FOR THREE – PHASE MOTORS

DIRECT START

Power 230 V – Motor 230 / 400

Power 400 V – Motor 400 / 690

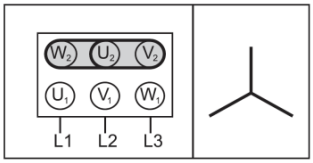
Power 415 V – Motor 415 / 720



Power 400 V – Motor 230 / 400

Power 690 V – Motor 400 / 690

Power 720 V – Motor 415 / 720



Pic. 8

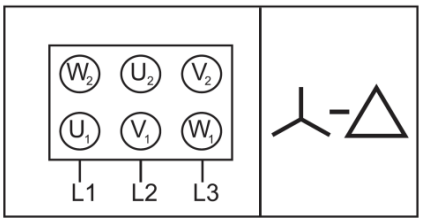
AVVIAMENTO Y – Δ

- Remove the terminal connection bands.
- The connection sequence is carried out in the controller.

Power 230 V – Motor 230 / 400

Power 400 V – Motor 400 / 690

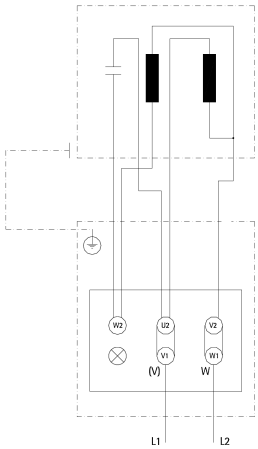
Power 415 V – Motor 415 / 720



Pic. 9

5.6.4 ELECTRICAL CONNECTION OF THE SINGLE –PHASE MOTOR

The single – phase motor is equipped with is proper condenser.
For a correct connection follow the diagram of the motor manufacturer or the diagram shown Pic. 10.



Pic. 10

5.6.5 ELECTRICAL CONNECTION OF THE VALVE GROUP

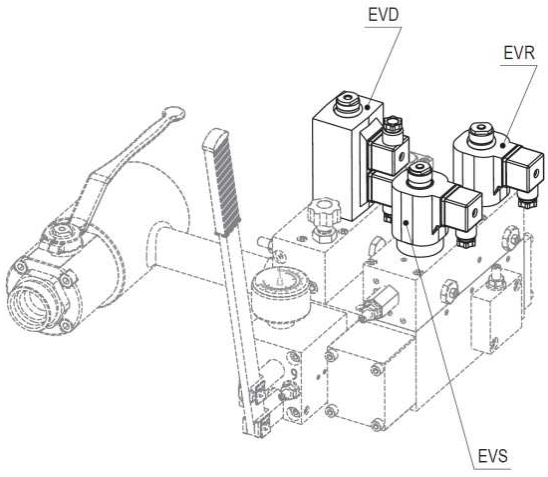
Valve NL (see Pic. 11) can be equipped with the following electro - valves:

EVD = Down travel electro – valve (both normal and emergency)

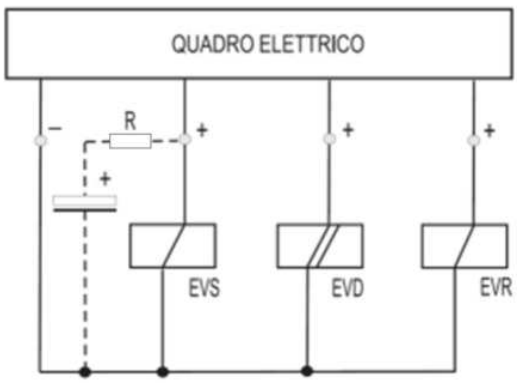
EVR = Deceleration electro – valve (high speed)

EVS = Up travel electro – valve (star – delta or soft starter)

For the electrical connections follow the diagram of Pic. 12.



Pic. 11



Pic. 12

The electro – valves have the following functions:

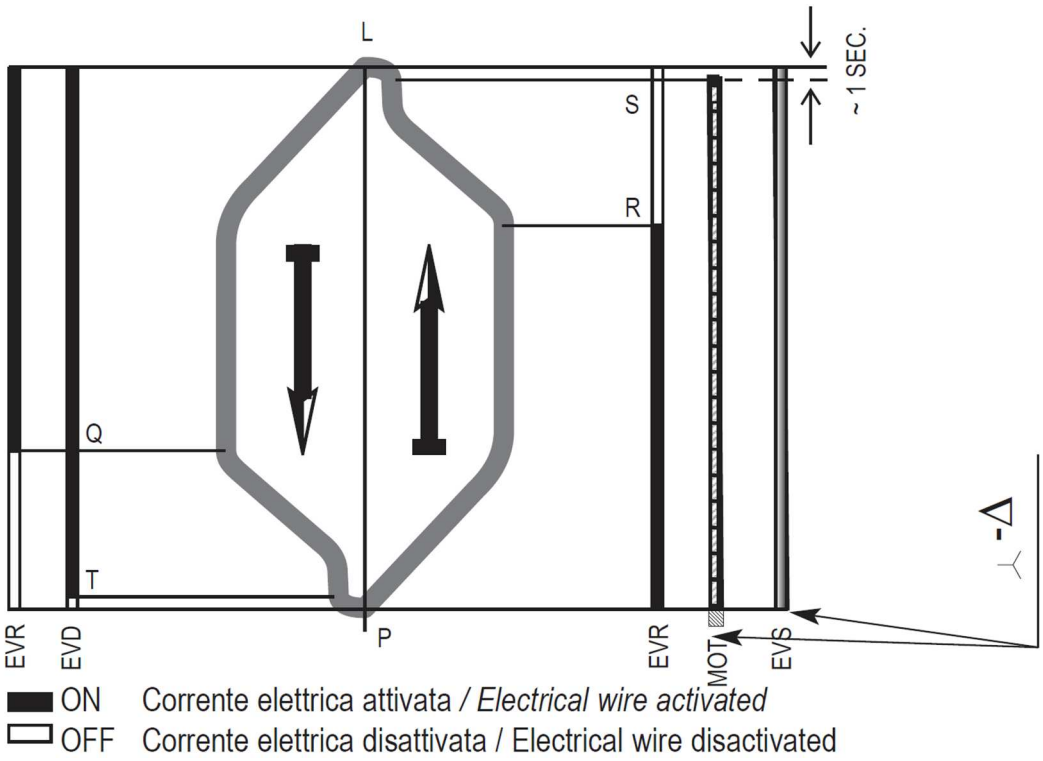
ELECTRO – VALVE EVD with double coil: it controls the down travel both in a normal and in an emergency condition, with battery 12 Vdc. When it is fed it allows the down travel with a low speed. This electro – valve has to be fed only during the whole down travel. Together with EVR, it allows the high speed.

ELECTRO - VALVE EVR with a single coil: it controls the high speed and the deceleration. This valve has to be fed both during the down and the up travels to reach the high speed; it has to be disconnected before reaching the floor to obtain the deceleration and the low speed. For a good deceleration, the EVR coil has to be disconnected according to the installation speed: the bigger the installation speed is, the bigger the distance from the landing floor has to be.

CAR SPEED	EVR DISCONNECTION	
	RAISED DISTANCE	DESCENT DISTANCE
0,40 m/s	0,50 m	0,60 m
0,60 m/s	0,70 m	0,80 m
0,80 m/s	0,90 m	1,00 m

- ELECTRO - VALVE EVS with a single coil: it is used for installations with λ – Δ START or SOFT STARTER (supplied on demand).
  This electro – valve controls the oil pressure. When the EVS coil is disconnected, the oil returns to the tank without pressure, through the VM valve; the motor is activated and reaches its rate without load. Only when the motor has reached its rate (Δ phase in case of λ – Δ starts, or when the start phase has finished, in case of a soft – starter), by feeding the EVS coil, pressure will begin to rise and keep the requested installation value until EVS is not disconnected. During the up travel, the EVS coil has to be kept connected for a moment after the stop. In this way a soft stop without bumps is obtained. This can be reached by connecting in parallel a 1000 – 1500 µF condenser properly supplied by OMARLIFT, to the electrical panel. The connection of the condenser to the coil, has to be carried out only when it is not possible to obtain the wished delay through the electrical panel. For the connection, please refer to the scheme shown in Pic. 13.

The valves for the direct start of the motor do not have the up travel EVS electro - valve. The down travel EVD electro – valve and the high speed EVR electro – valve have to be fed as pointed out in the previous paragraphs. The delay in the pressure activation of the pump is carried out automatically by the hydraulic circuit. This system is usually used for low power motors.



Pic. 13

Available voltages for coils:	12 – 24 – 48 – 60 – 110 – 180 – 220 VDC.
Coil power:	EVS:36 W EVD 36 W + 45 W EVR: 36 W
P – UP TRAVEL:	Feed motor and coil “EVR” Feed coil “EVS” for λ – Δ or soft starter
R – UP TRAVEL DECELERATION :	Disconnect “EVR”
S – STOP DURING UP TRAVEL:	Stop motor (disconnect “EVS”, if it exists, about 1” after the motor)
L – DOWN TRAVEL:	Feed coils “EVD” and “EVR”
Q – DOWN TRAVEL DECELERATION:	Disconnect “EVR”
T – STOP DURING DOWN TRAVEL:	Disconnect “EVD”

In case there is the UCM device against the unintended car movement (HDU valve), it is important to control also the EVD HDU coil. Please, refer to the manual of the HDU valve.

5.6.6 OIL TEMPERATURE THERMOSTAT

Inside the tank there is a thermostat to avoid the oil overheating. The thermostat connections are fixed to two terminals inside the connection box of the motor.
The oil temperature thermostat has to be connected so that, in case of oil overheating, the car stops at a floor where the passengers can get out. The automatic return in active service, has to take place only after a sufficient oil cooling.

MAIN THERMOSTAT CHARACTERISTICS		
Normally closed	NC	
Tripping temperature	70° C – 5%	
Reset temperature	55 - 35° C	
Nominal voltage	250 Vdc	100 Vdc
Nominal current	1,6 A	2,5 A

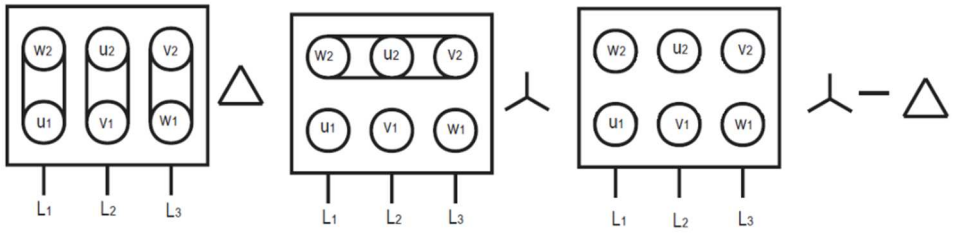
5.6.7 MOTOR THERMISTORS

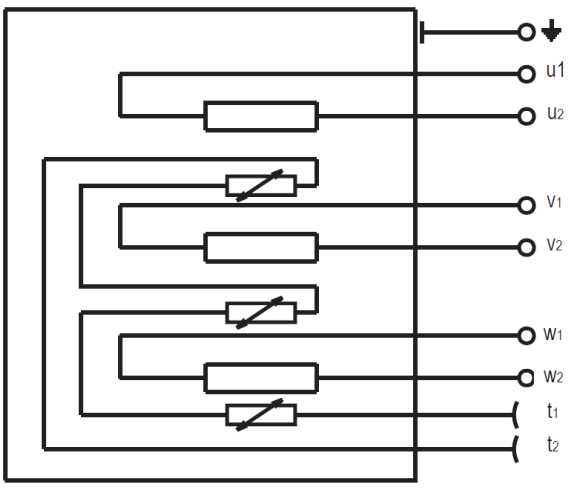
The temperature in the motor windings is controlled by three thermistors connected in series. The thermistors are fixed to two clamps inside the electrical board of the motor.
The motor thermistors have to be connected to the suitable relay, able to detect the thermistors' resistance variation, and consequently to drive the interruption of the electrical motor's feeding.
Attention, the thermistors should not be submitted to tensions higher than 2,5 V.
When the thermistors are properly connected, they protect the motor against the overheating of the windings. Overheating could be caused by:

- Lack of a phase in the feeding
- Too frequent activation
- Excessive tension variations
- Excessive oil temperature

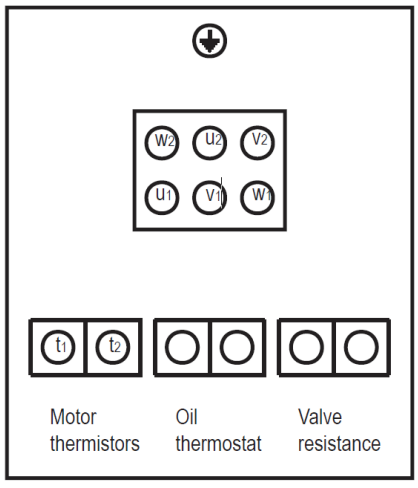
MAIN THERMISTOR CHARACTERISTICS	1 PIECE	3 PIECES
Tripping temperature “Ti”	110° C	110° C
Tolerance	-5%	-5%
Resistance at 25° C	≤ 100 Ω	≤ 300 Ω
Resistance at Ti-5° C	≤ 550 Ω	≤ 1650 Ω
Resistance at Ti+5° C	≥ 1330 Ω	≥ 3990 Ω
Resistance at Ti+15° C	≥ 4 k Ω	≥ 12 k Ω
Maximum supply voltage	≤ 2,5 V	≤ 7,5 V

Collegamento motore trifase
Threephse motor connection





Motore con termistori
Motor with thermistors

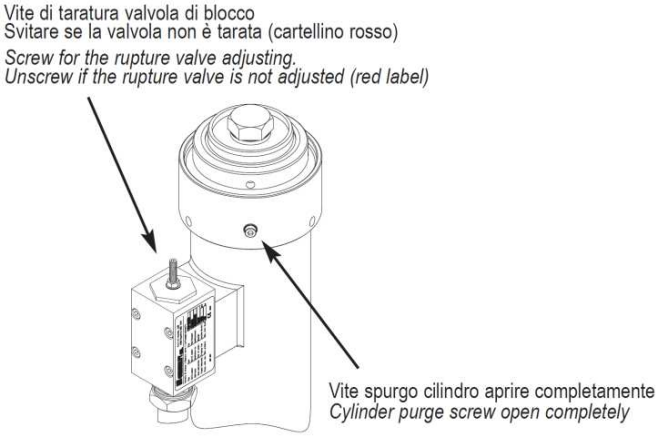


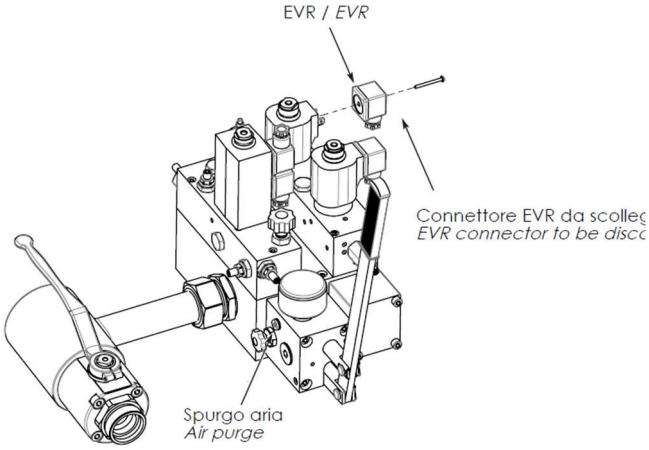
Scatola di collegamento motore
Motor connection box

5.7 AIR PURGE

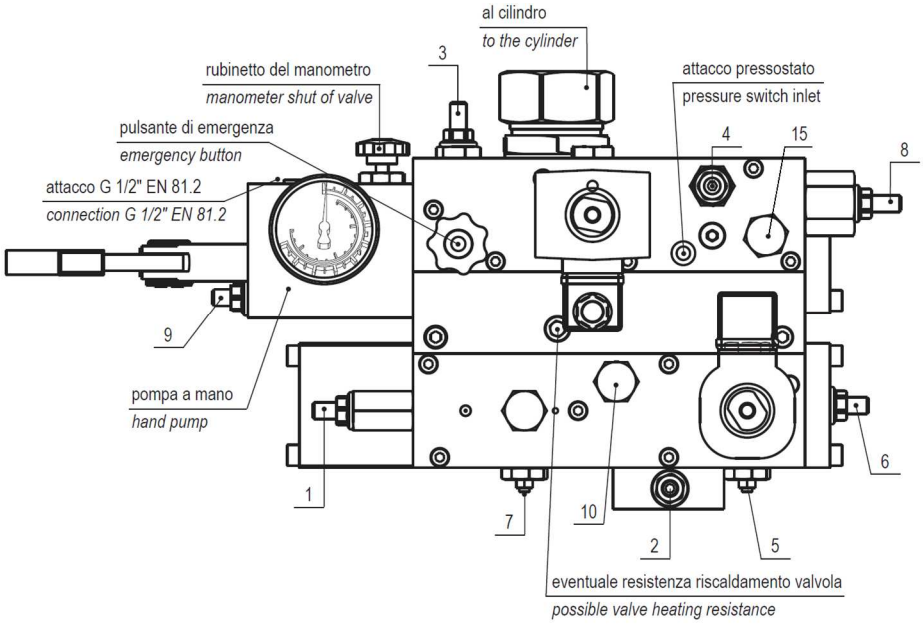
When an installation is new, the tank, the cylinder, the connection pipes, the valve and the silencer have no oil inside. Consequently, it is necessary to fill very well all the components of the hydraulic circuit and purge air out of them completely. Before pouring the oil into the tank, make sure that there is no dirt or water inside. The air has to be purged from the highest point of the circuit which normally is the cylinder head. The oil has to enter the circuit very slowly, without creating turbulence and mixing with air which needs time to get out.

- Fill the tank with new and good quality oil. The oil quantity should be almost enough to cover the motor when the cylinder is completely out, while when the cylinder is closed the level should be maximum 8/10 cm under the cover.
- Connect electrically the motor and the valve to the controller, checking all the connections carefully.
- Unscrew the purge screw on the cylinder's head and disconnect the high speed EVR coil (this operation will allow a slow cylinder filling up without turbulences).
- Close the main shut off valve and open the manometer valve. Start the motor and check the pressure increase on the manometer. If the revolving sense is not correct, the pressure will not increase and the pump will make a remarkable noise. In these conditions, stop the motor immediately, check its connection and repeat the test.
- Open the main shut off valve, close the manometer valve and fill the cylinder starting the motor for some seconds. Then stop to allow the air getting out. Repeat this last operation several times until pure oil comes out from the purge screw, without air and close it.
- If the car lowers or rises remarkably when the load varies repeat the air purge after having left the installation motionless for some hours with the cylinder resting low, without pressure and with the purge screw open.
- After all the checks have been carried out, remember to block the adjusting screws and close the manometer valve.





5.8 NL BLOCK VALVE ADJUSTING

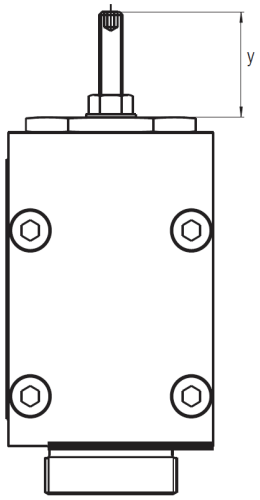


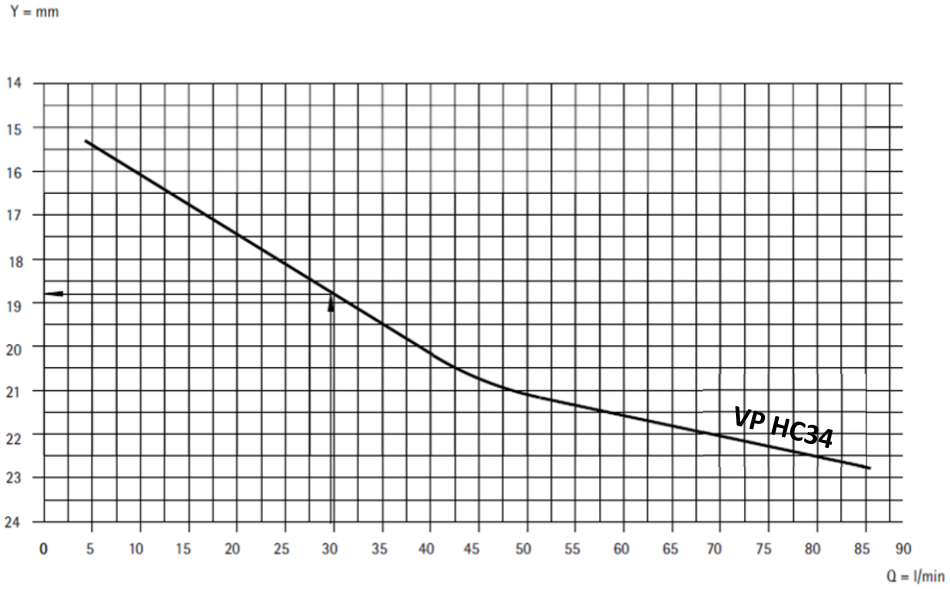
SCREW	DESCRIPTION	REGULATIONS
N°1	Adjusting of the valve max pressure	Screw to increase max pressure Unscrew to decrease max pressure
N°2	Upward and downward low speed regulation	Screw to decrease low speed Unscrew to increase low speed
N°3	Rod counter-pressure and rope anti–loosening device adjusting	Screw to have not rod drop with emergency button pressed Unscrew to have rod drop with emergency button pressed
N°4	Screw device for rupture valve testing	Screw deeply: the car speed tends to exceed the nominal speed
N°5	Choke device for deceleration from high to low speed in upward and downward directions	Screw to make the car brake more slowly Unscrew to make the car brake more quickly
N°6	High speed limiter	Screw to reduce the upward speed Unscrew to increase the upward speed up to the max allowed by the pump
N°7	Choke device for pressure activation and upward start	Screw to slow down the pressure activation with a consequent smooth start Unscrew to obtain an immediate pressure activation with a consequent quick start
N°8	Down high speed regulation	Screw to increase the downward speed Unscrew to decrease the downward speed
N°9	Hand pump pressure adjusting	Screw to increase the hand pump adjusting pressure Unscrew to decrease the hand pump adjusting pressure
N°10	Upward start delay for soft starter (in configurations without EVS electrovalve only)	Screwing, increase the delay for upward start Unscrew, the time of the upward start decrease
N°15	Downward start regulation	Screw, to soften the downhill start Unscrew, to quick the downhill start

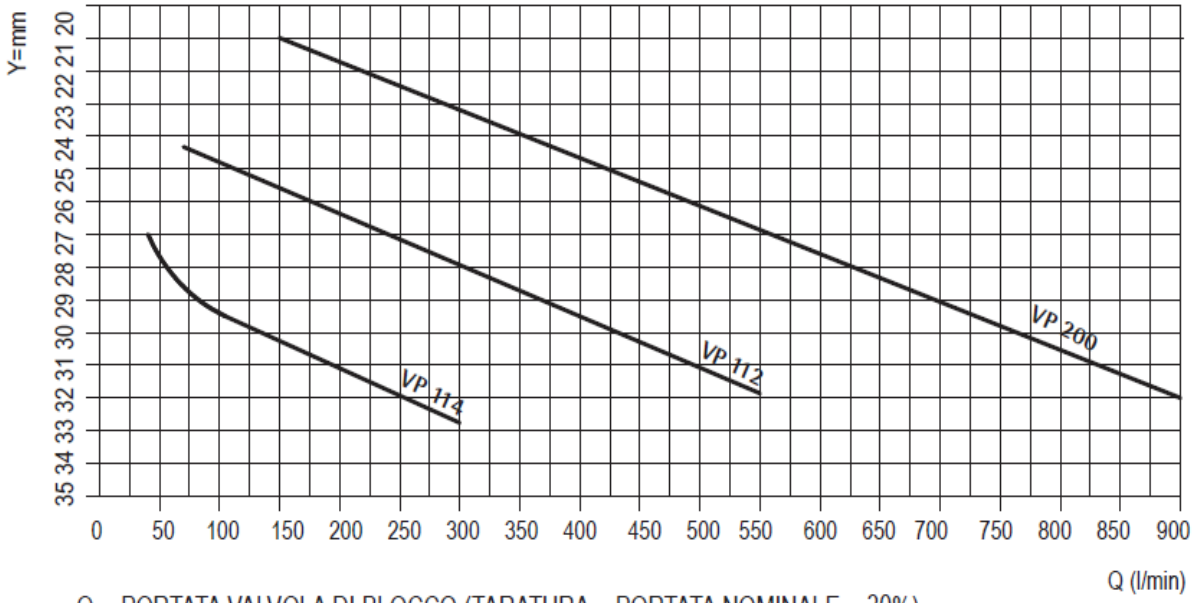
5.9 VP RUPTURE VALVE ADJUSTING AND TESTING

5.9.1 GENERAL CHARACTERISTICS

Valve	R Fitting	Q nominal [l/min]	Q set up max [l/min]	Pressure range [bar]
HC 034	F – 3/4" Gas	5 ÷ 55	85	10 ÷ 80
VP 114	M – 45 x 2	35 ÷ 150	300	10 ÷ 80
VP 112	M – 52 x 2	70 ÷ 300	550	10 ÷ 80
VP 200	F – 2” Gas	150÷ 600	900	10 ÷ 80

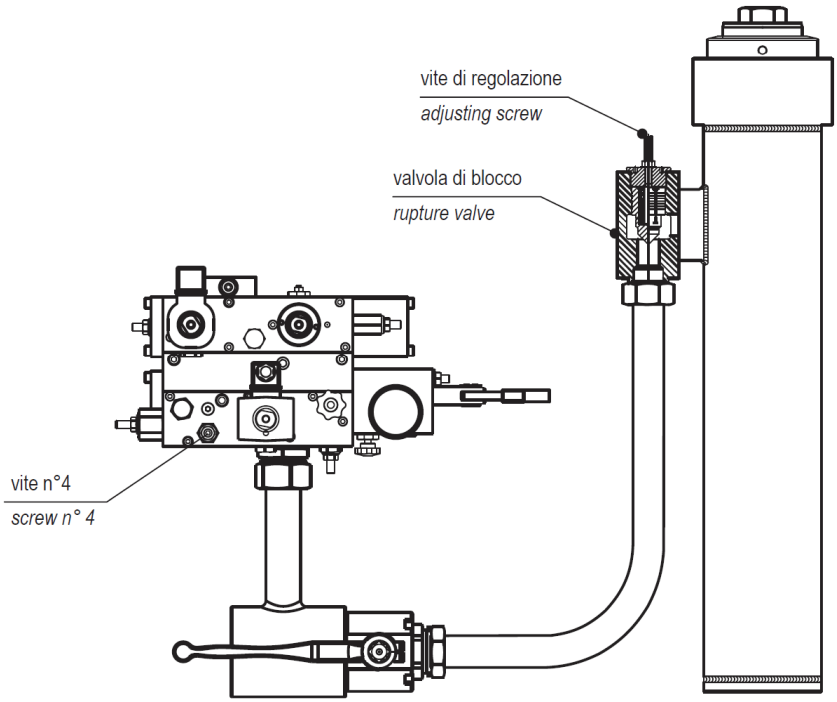






Q = PORTATA VALVOLA DI BLOCCO (TARATURA = PORTATA NOMINALE + 30%)
Q = RUPTURE VALVE FLOW (SET UP FLOW = NOMINAL FLOW + 30%)

5.9.2 RUPTURE VALVE ADJUSTING

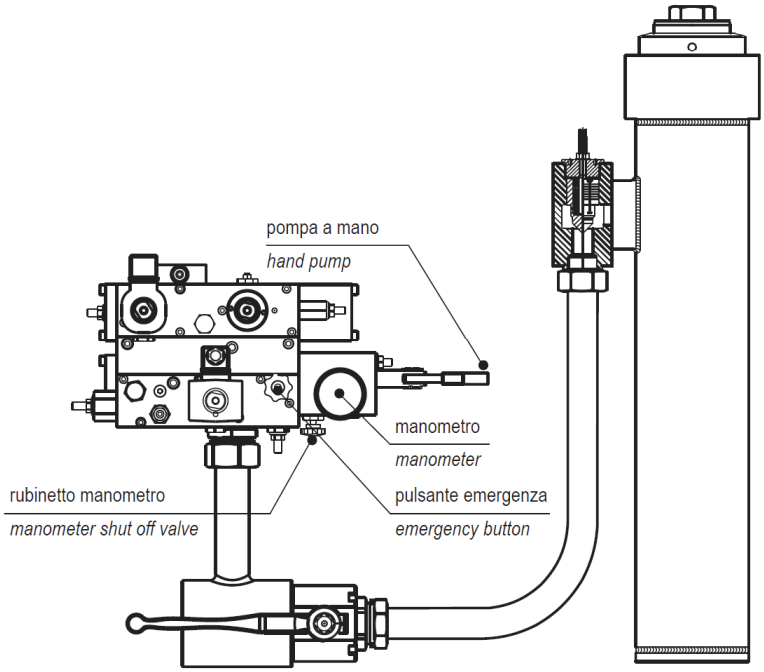


- Adjust the rupture valve putting the adjusting screw at the Y-value taken from the graph of the rupture valve adjusting, on the basis of the oil quantity which increases by 30% about the down speed.

  ⚠ Multiply by 1,3 coefficient the pump capacity for installations with one rupture valve (one cylinder). Multiply by 1,3 half of the pump capacity for installations with two rupture valves (two cylinders).

- Screw in the screw n°4 located in the pump unit valve group, until it is completely closed.
- Make a descent from the highest floor to the lowest.
- The car speed will increase, up to exceed the nominal speed.
- The rupture valve will intervene when the down speed increases by 30% about and the car will decelerate up to stop.
- If after some metres run with a speed higher than the nominal one, the rupture valve has not intervened, stop the car pushing the “Stop” button. Adjust again the rupture valve screwing the adjusting screw gradually (1/4 turn by 1/4 turn) and repeat the test.
- Open again the screw n°4 by two turns and fix it with the proper nut. Check that the valve does not intervene during the descent at these conditions. Otherwise unscrew the rupture valve lightly and repeat the test.
- When the test has finished, block the regulation screw with the lock nut and seal with red paint or link with iron wire the proper holes located one on the screw and the other on the valve body an seal with lead.

5.10 INSTALLATION CHECK AND TESTING



5.10.1 INSTALLATION TEST AT TWO TIMES THE MAXIMUM STATIC PRESSURE

Open the shut – off valve of the manometer.

Send the cylinder to upper end position and stop the motor.

Increase the pressure through the hand pump until double the maximum static pressure at full load.

Check that there are no losses along the pipes and that the pressure loss, within five minutes at even temperature, is restrained to 5/6 bar.

Release the pressure activating the emergency button manually.

Close the shut – off valve of the manometer and restart the installation.

NB: This test must be carried out with even temperature. Take into consideration that the decrease of 1 centigrade of the installation temperature causes a pressure decrease of 9 bar.

5.10.2 CHECK OF THE EMERGENCY AND ROD'S DESCENT FOR INDIRECT INSTALLATIONS

Block the car on the parachute devices.

Push the manual emergency button.

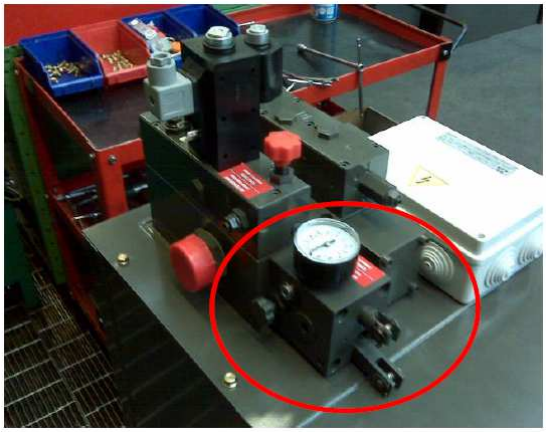
Check that the rod, charged with the load of ropes and pulleys only, does not go down. If necessary, screw the screw n° 3 until it's blocked.

Unblock the car with the ascent drive.

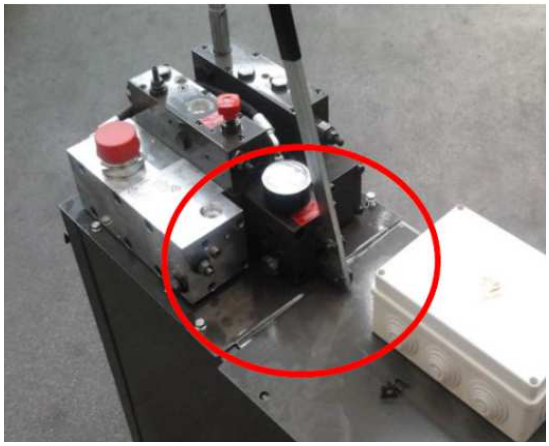
Check that when the car is free to go down, it goes down regularly at a reduced speed when the emergency button is pushed.

5.10.3 PROCEDURE TO ACTIVATE THE HAND PUMP

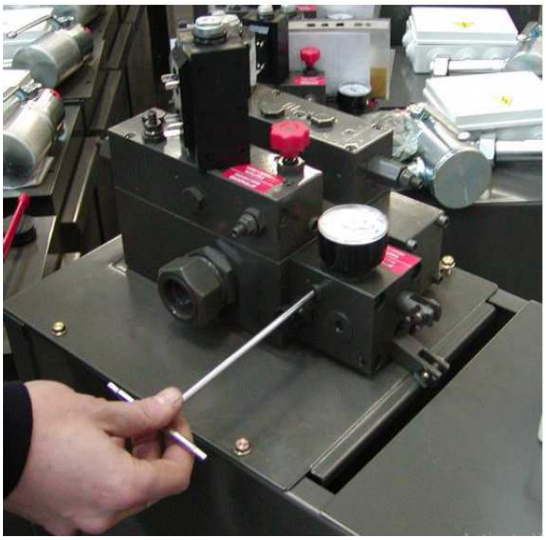
The following procedure allows to remove the air inside the hand pump. To activate the pump, pull again and again the pump lever that is positioned as shown in the Pictures below, depending from the system configuration. In case there are difficulties in activating the hand pump, close the main shut–off valve, unscrew the screw shown Pic. 21 and Pic. 22 with Allen key CH5 and quickly activate the hand pump lever, until oil comes out of the screw. At this point close the screw.



Pic. 14 – For system without HDU or with HDU stand alone



Pic. 15 – Installations with integrated HDU valve



Pic. 16 – For system without HDU or with HDU stand alone

Pic. 17 – Installations with integrated HDU valve

5.11 INSTALLATION MAINTENANCE

5.11.1 GENERAL INFORMATION

Generally, the hydraulic components are not subject to a frequent wear, they are safe and need few maintenance operations. These results are reached when the components are chosen and dimensioned correctly on the basis of the installation characteristics. Moreover, the hydraulic oil has to suit with the room temperature and the installation traffic conditions.

- It is however necessary to make, according to the established times, the test and maintenance operations reported in the periodical recommended maintenance sheet and get rid of the detected faults immediately. (Tab. 1).
- In case irregularities or faults, which can jeopardize the safety of people and installations, are met on the components, the installation has to be put out of service until the defective parts are repaired or replaced.

PERIODICAL RECOMMENDED MAINTENANCE OPERATIONS	PARAGRAPHS OF THE INSTRUCTIONS MANUAL D840 TO WHICH REFER FOR THE PERIODICAL MAINTENANCE			
	INSTALLATION COMPLETED	EVERY 2 -3 MONTHS	EVERY YEAR	EVERY 5 – 10 YEARS
CHECK OF THE SEALING OF THE CYLINDER SEALS	10.2.2	10.2.2		10.2.2 10.3
CHECK OF THE SEALING OF THE VALVE SEALS	10.2.3		10.2.3	10.2.3
CHECK OF THE PIPE SEALING	10.2.1		10.2.1	
CHECK OF THE OIL LEVEL AND PRESERVATION	6.1	6.1	10.6	10.6
CLEANING OF THE SHUT – OFF VALVE AND VALVE FILTERS	10.5		10.5	
CHECK OF THE PRESSURE ADJUSTING AT TWICE THE MAX STATIC PRESSURE	6.2 6.5		6.2 6.6	
CHECK OF THE RUPTURE VALVE WORKING	7.3	7.3		
CHECK OF THE ROPE ANTI – LOOSENING COUNTER - PRESSURE	6.7 8.2.7		6.7 8.2.7	
CHECK OF THE ANTI – CREEP SYSTEM	10.7	10.7		
CHECK OF THE EMERGENCY AND BATTERY	10.8		10.8	
CHECK OF THE MOTOR FEEDING TIME	6.9		6.9	
PLATES – DIAGRAMS - INSTRUCTIONS	10.9		10.9	
GENERAL OVERHAUL				xxxx

Tab. 1

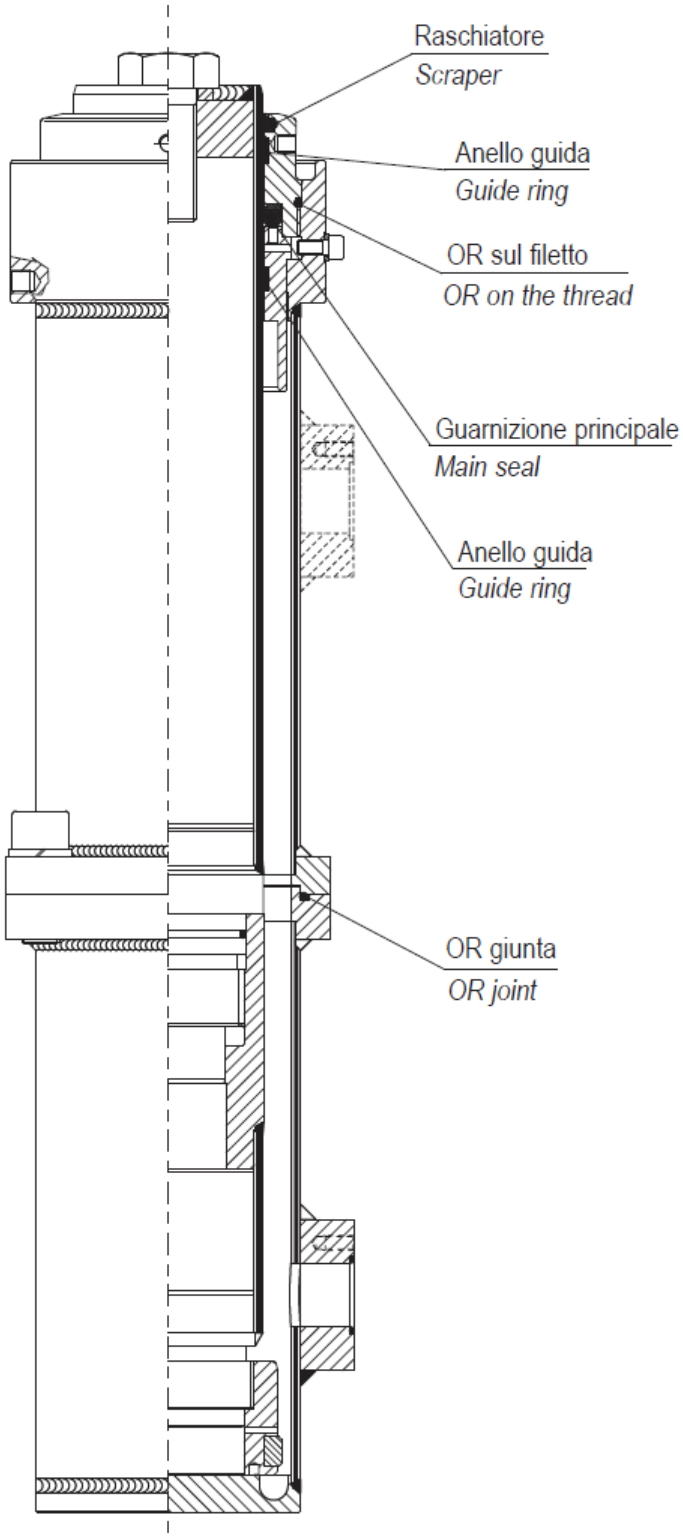
5.11.2 SEALS REPLACING ON A SINGLE STAGE CYLINDER

The seals of a normal cylinder are positioned on the cylinder head. Seal replacement consists in replacing the three sealing parts (though in the most of cases it would be enough to replace the main seal only):

- The main seal of the rod;
- The sealing O-ring on the iron ring thread;
- The rod scraper.

The iron ring which holds the seal is screwed. The unscrewing operation is facilitated by 4 blind threaded holes M10. It is possible to unscrew the iron ring introducing 4 screws in the 4 holes or using proper hook spanners which can be found on the market. Before replacing the seal, control the rod surface and get rid of the possible irregularities, such as scores or bruises which could damage the new seals:

- Take the car in upper extra travel and the cylinder in upper end position.
- Carefully take a place near the head and, if necessary, sling with a rope to be able to work safely and freely.
- Check the rod surface half metre by half metre, all along its length, making a slow down travel using the hand emergency push button.
- Get rid of any irregularities found visually or touching it by using a thin abrasive paper.
- After having controlled the last half metre of the rod, operate to replace the seals:
- Block the car, using stops in the most comfortable position. In case of indirect acting installations, block with a stop event the support of the pulley.
- In case of direct acting installation disconnect the rod from the frame. While in case of indirect acting ones, disconnect the rod from the pulley.
- Clean the cylinder head, unscrew completely the screw n° 3 of the counter – pressure. Make the rod break back until the manometer shows pressure = zero.
- Unscrew the threaded iron ring holding the seals.
- Remove the old seal, the O-ring on the thread and the scraper.
- Control and clean the guide rings and position them in their place.
- Clean and control the seats, reassemble the new seals, paying attention not to damage them and position them in the same way as the old ones.
- Screw the iron ring with the new seal, purge the air and put the installation into action.


Raschiatore
Scraper
Anello guida
Guide ring
OR sul filetto
OR on the thread
Guarnizione principale
Main seal
Anello guida
Guide ring
OR giunta
OR joint

5.11.3 SEALS REPLACING ON TELESCOPIC CYLINDERS

In synchronised telescopic cylinders, the oil of the pump unit acts only on the piston of the biggest rod. The other rods move thanks to the oil inside the cylinder rooms which, have no contact with the pump unit. The internal volumes of these rooms allow the upper rods to run their complete travel.
For a correct working, the internal rooms of the synchronised telescopic cylinder need to be filled with oil and kept filled. The oil lost in the internal rooms during the working makes the cylinder loose its synchronism. For this reason, the seals of the cylinder have a very important role. Deep attention has to be paid to the preservation of the rods and to the oil cleaning.

- Every head of a telescopic cylinder has its own set of seals to avoid oil losses towards the outside.
- The smaller cylinder has a plunging piston without seals.
- The piston of the bigger rods (one for two – stage telescopic cylinders and two for three – stage telescopic cylinders), have a seal to prevent the oil from going from the upper room to the lower one.
- The piston of the big rods have not only a sealing seal, but also a small valve which is normally closed and opens only when the cylinder is completely closed to allow the filling of the rooms.

A. SEAL REPLACEMENT ON TWO – STAGE TELESCOPIC CYLINDERS (CT-2)

In case of two – stage telescopic cylinders (see Pic. 18) the seals to be replaced are:

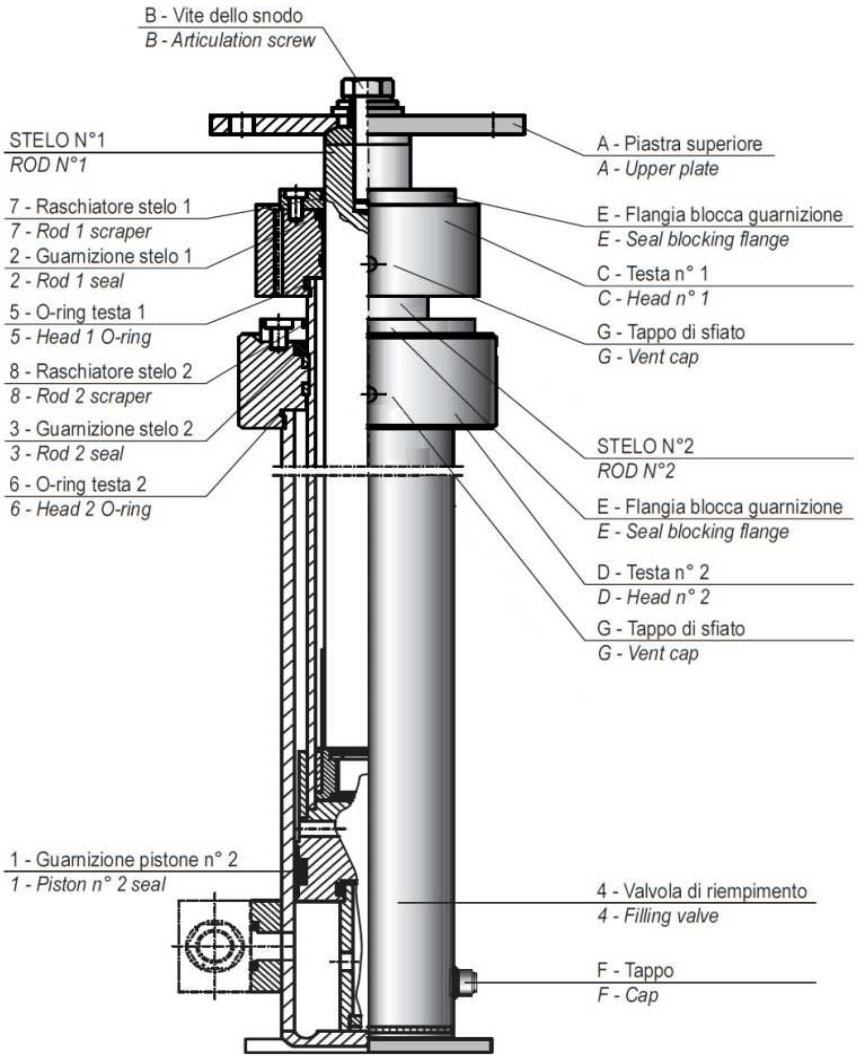
- N° 1 internal seal, on the piston of rod n° 2
- N° 1 set of seals - head n° 1
- N° 1 set of seals - head n° 2

The following tools are needed to replace all the seals, included the piston one:

- N° 1 hoist to extract the rods out of the cylinders (the hoist capacity has to be at least the same as the weight of the heaviest rod).
- N° 1 or more recipients to collect the oil.
- N° 1 suction pump to suck oil from the cylinder inside.

How to operate:

a) Block the car with stops in the more comfortable position: up, in case of direct central acting installations; under the cylinder head, in case of direct side acting cylinders.
b) Remove the 4 screws which block the upper plate “A” to the frame, remove the guide arms, if existing and fix under the head “C” a tool (screwer or bridle) needed to keep the rod still, when its head will be disassembled.
c) Clean the heads and make the rods break back completely with hand manoeuvre. Unscrew the screw n° 3 to take pressure to zero.
d) Unscrew the screw “B” of the articulation and remove plate “A”.
e) Unscrew the head “C” and unthread it from the rod.
f) Re – position the upper plate “A” to be able to unthread the rod n°1. Lean it vertically in the shaft, paying attention not to damage it.
g) Remove the oil PVC pipe, unscrew the head “D” and unthread it from the rod.



Pic. 18 Particolare cilindro telescopico CT - 2

h) Before taking out the rod n° 2, it is necessary to open the hydraulic circuit to allow the air to get into while the rod is lifted. In case of direct central acting installations, remove the fitting on the shut – off valve, while in case of direct side acting installations, unscrew the cap “F” of the cylinder. The oil lost during this operation has to be promptly collected.
i) Screw again the head “C” to be allowed to hook the rod n° 2 and take it out slowly to avoid leakage of oil which will be sucked by the suction pump.
j) Replace seal “1” on the piston of the rod n° 2. Respect the position of the different parts, as per the original seal. The replacement of the O-ring of the filling valve is difficult, but, since this seal is static, no replacement is needed.
k) Check carefully the whole surface of the two rods; get rid of any bruise or scratch using a fine abrasive paper.
l) Reassemble the rod n° 2 into the cylinder. Be careful not to damage the seal.
m) Replace the seal, the scraper and the O-ring of the head n° 2, removing the flange which blocks the seal “E”. Reassemble the head n° 2.
n) Reassemble rod n° 1 inserting it in rod n° 2.
o) Replace the seal, the scraper and the O-ring of the head n° 1, removing the flange which blocks the seal “E”. Reassemble the head n° 1.
p) Reassemble plate “A” and fix it with the screw “B” and its components.

q) Close the hydraulic circuit, put back the cap “F” or screw the fitting of the shut – off valve, remove the screwer and make the cylinder close on itself.
r) Fill up and purge the air of the cylinder, very slow at low speed, removing the vent caps “G” of the two heads. Close the vents only when clear oil without air comes out from them.
s) Reassemble the guide arms, if existing and make the cylinder rise until it leans against the car which could finally be reconnected to the plate “A” with its 4 screws.
t) After the first travel, check the synchronism and, if necessary, do again the filling up and the synchronisation.

B. SEAL REPLACEMENT ON THREE – STAGE TELESCOPIC CYLINDERS TYPE CT-3

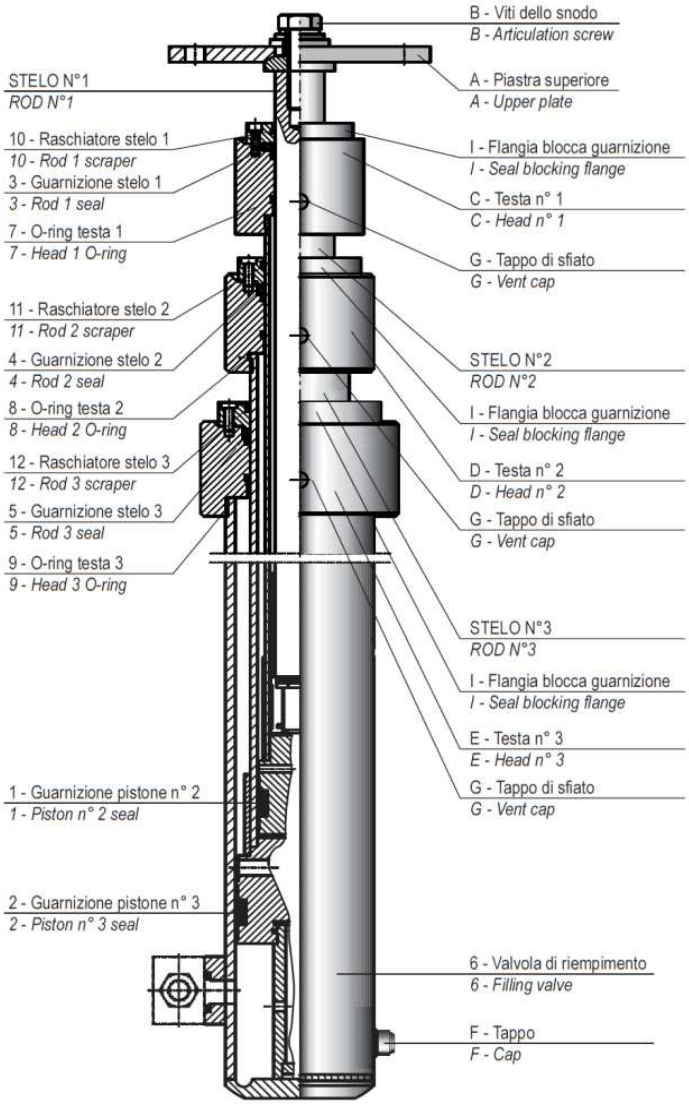
In case of three – stage telescopic cylinders (see Pic. 19)the seals to be replaced are:

- N° 1 internal seal, on the piston of rod n° 2
- N° 1 internal seal, on the piston of rod n° 3
- N° 1 set of seals - head n° 1
- N° 1 set of seals - head n° 2
- N° 1 set of seals - head n° 3

The tools needed for the replacement of all the seals are the same necessary for the two – stage telescopic cylinder

How to operate:

a) Block the car with stops in the more comfortable position: up, in case of direct central acting installations; under the cylinder head in case of direct side acting cylinders.
b) Remove the 4 screws which block the upper plate “A” to the frame, remove the guide arms, if existing and fix under the heads “C” and “D” a tool (screwer or bridle) needed to keep the rods still, when their heads will be disassembled.
c) Clean the heads and make the rods break back completely with hand manoeuvre. Unscrew the screw n° 3 to take pressure to zero.
d) Unscrew the screw “B” of the articulation and remove plate “A”.
e) Unscrew the head “C” and unthread it from the rod.
f) Re – position the upper plate “A” to able to unthread the rod n° 1. Lean it vertically in the shaft, paying attention not to damage it.
g) Unscrew the head “D”, after having checked that the two screws “H” are released, and unthread it from the rod n° 2.
h) Before taking out the remaining rods, it is necessary to open the hydraulic circuit to allow the air to get into while the rods are lifted. In case of direct central acting installations, remove the fitting on the shut – off valve, while in case of direct side acting installations, unscrew the cap “F” of the cylinder. The oil lost during this operation has to be promptly collected.
i) Screw the head “C” to hook the rod n° 2 and take it out slowly to avoid oil leakage which will be sucked by the suction pump. Lean this rod vertically in the shaft, protect it and pay attention not to damage it.
j) Remove the oil PVC pipe, unscrew the head “E” and unthread it from the rod n° 3, after having checked that the two block screws “H” have been released.
k) Screw the head “D” to hook the rod n° 3 and take it out slowly to avoid oil leakage which will be sucked by the suction pump.



Pic. 19 Particolari cilindro telescopico CT – 3

l) Replace the seal “2” on the piston of the third rod. Respect the position of the different parts, as per the original seal. The replacement of the O-rings of the filling valves is difficult, but, since this seal is static, no replacement is needed.
m) Check carefully the whole surface of the rods n° 3; get rid of any bruise or scratch using a fine abrasive paper.
n) Reassemble the rod n° 3 into the cylinder. Be careful not to damage the seal.
o) Replace the seal, the scraper and the O-ring of the head n° 3, removing the flange which blocks the seal “I”. reassemble the head n° 3.
p) Replace the seal “1” on the piston of rod n° 2. Respect the position of the different parts, as per the original seal.
q) Check carefully the whole surface of the rod n° 2; get rid of any bruise or scratch using a fine abrasive paper.
r) Reassemble rod n° 2 into the cylinder. Be careful not to damage the seal.
s) Replace the seal, the scraper and the O-ring of the head n° 2, removing the flange which blocks the seal “I”. Reassemble the head n° 2.
t) Check carefully the whole surface of the rod n°1; get rid of any bruise or scratch using a fine abrasive paper.
u) Reassemble the rod n° 1 inserting it rod n° 2.

v) Replace the seal, the scraper and the O-ring of the head n° 1, removing the flange which blocks the seal “I”. Reassemble the head n° 1.
w) Reassemble plate “A” and fix it with the screw “B” and its components.
x) Close the hydraulic circuit, put back the cap “F” or screw the fitting of the shut – off valve, remove the screwers and make the cylinder close on itself to fill up and purge the air.
y) Fill up and purge the air of the cylinder, very slow at low speed, removing the vent caps “G” of the three heads. Close the vents only when clear oil without air comes out from them.
z) Reassemble the guide arms, if existing and make the cylinder rise until it leans against the car which could finally be reconnected to the plate “A” with its 4 screws. After the first travel, check the synchronism and, if necessary, do again the filling up and the synchronisation.

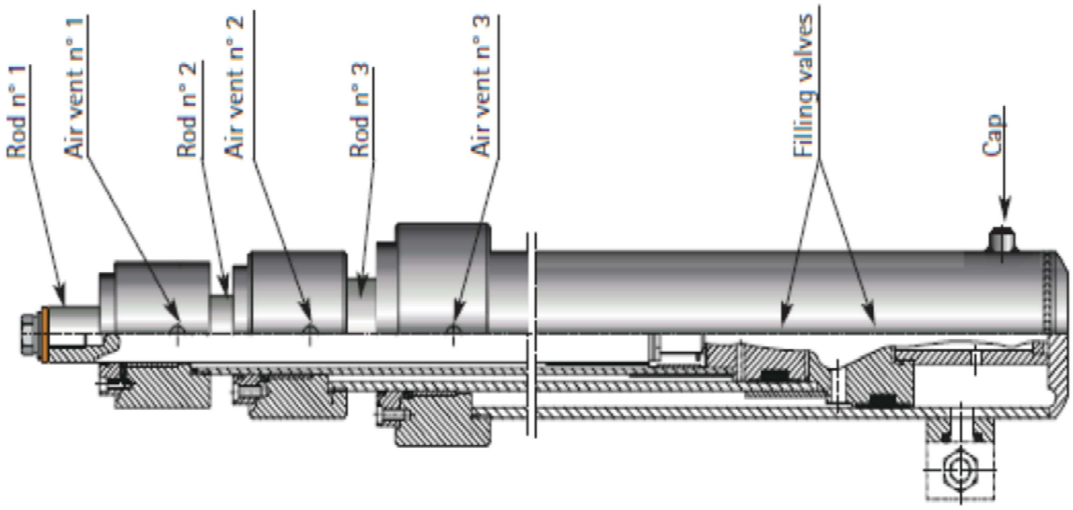
5.11.4 SYNCHRONISATION OF TELESCOPIC CYLINDERS

The OMARLIFT telescopic cylinders are hydraulically synchronised and therefore it is necessary to fill and keep their internal spaces filled to obtain a synchronised movement of all the stages, all along their travel and to avoid jerk. When the cylinder closes, during the last 4/5 mm of downward travel, the internal valves open and allow the filling of the internal spaces.
Therefore, to fill the internal spaces or to restore the synchronism of the cylinder when needed, operate as follows:

1. Wait that the cylinder and the oil of the internal spaces have been cooled according to the room temperature.
2. Remove the dampers under the car and make the car go down completely, checking that the stages of the cylinder are closed and that the weight of the car is totally on top of the cylinder.

⚠ ATTENTION – DANGER OF CRUSHING: Remember that without dampers, the safety distance in the pit and between the guides are not respected!

3. Open all the vents on the cylinder heads of each cylinder stage.
4. Disconnect electrically coil EVR for high speed so that only a small quantity of oil gets into the cylinder.
5. Activate the motor for an up travel for 10 – 15 seconds and stop it for 20 – 30 seconds to allow the air to go out. Repeat this operation several times, until only oil, without air, comes out from the purge screw.
6. Close the purge screw of the cylinder.
7. In case the pump unit is located higher than the cylinder head, purge the air also from the proper screw on the shut – off valve.
8. Reset the oil level in the tank, if necessary.
9. Connect again the coil of the electro – valve EVR.

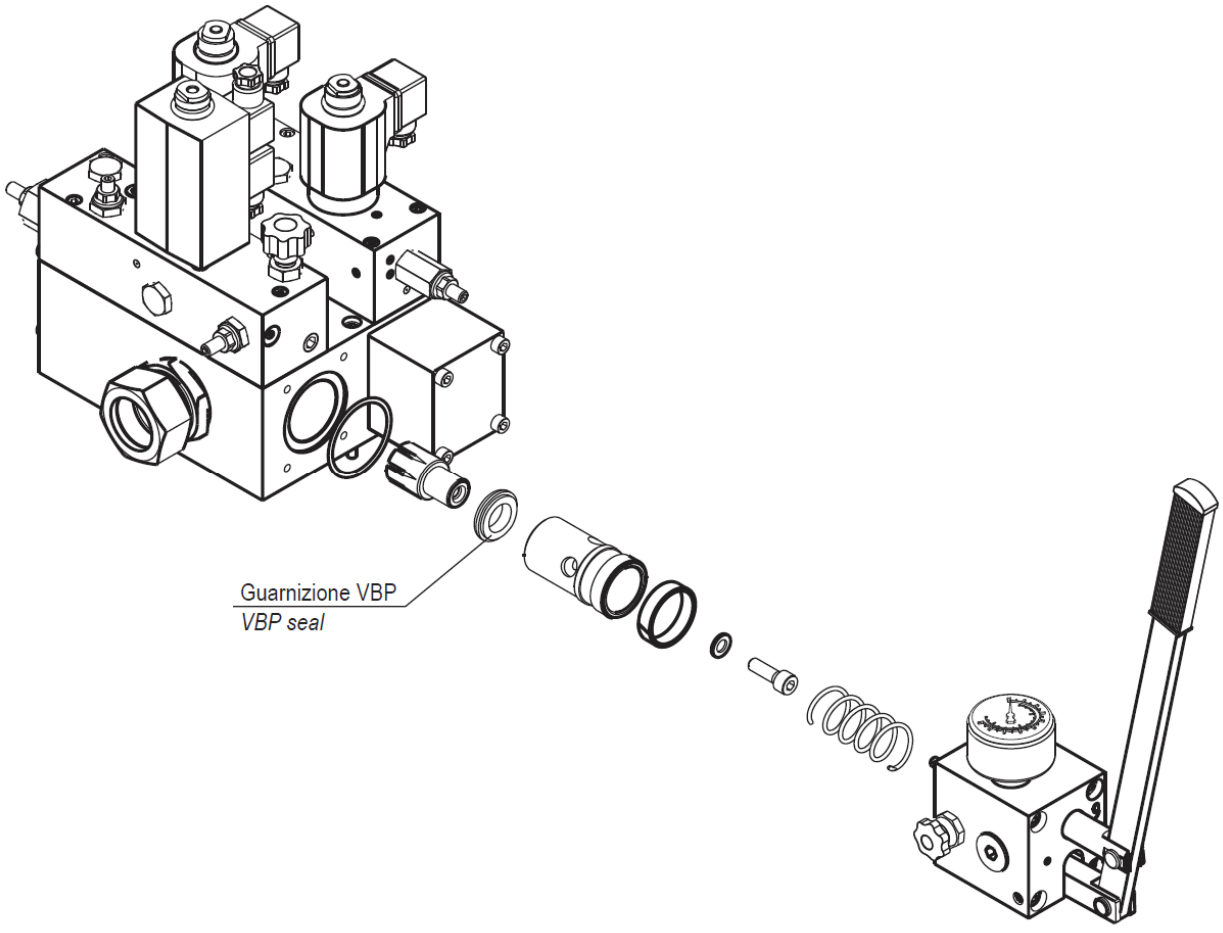


5.11.5 REPLACING OF SEAL VBP NL VALVE

The VBP valve (non – return valve) has to keep the main line closed when the car is motionless. The perfect sealing is guaranteed by a seal laying between the two parts which compose its piston. This seal wears with the passing of the time and can be damaged by metal particles which engrave it and hinder its sealing because they come between seat and seal.
Operate as follows to get rid from VBP losses:

a) Check that VBP piston runs well and, if necessary, remove dirt and clean with a thin cloth.
b) Check that the electro – valve EVD closes perfectly, when the coil is disconnected.

Replace the VBP seal as explained hereunder (see Pic. 20):



Pic. 20

c) Close the main line shut – off valve.
d) Unscrew the screw n° 3 for rod counter – pressure and take pressure back to zero using the hand manoeuvre button.
e) Remove the hand pump to reach VBP piston.
f) Unscrew the screw which holds the two parts of the piston tight and replace the seal laying between them. Be careful to position it in the right way.
g) Reassemble all the parts paying attention to the O-ring which lays between the valve and the hand pump.

6 HOMELIFT

6.1 GENERAL INFORMATION

The HOMELIFT pump units are projected and constructed by respecting the European standards EN 81-20/50 even if the typical application for HOMELIFT hydraulic components is for platform lift installations, under Machine Directive, or installation with reduced loads and oil flow.

The power unit can be supplied in different configurations: with HC valve one- or two-speed, with a submerged or external single-phase or three-phases motor, all combined with different oil capacity tanks, to satisfy different travel-length requirements.

These pump units are equipped with a ball shut–off valve with connection for 1/2" or 3/4” pipes, hand pump, and inspectable filter according to EN 81-20/50, as standard or optional.

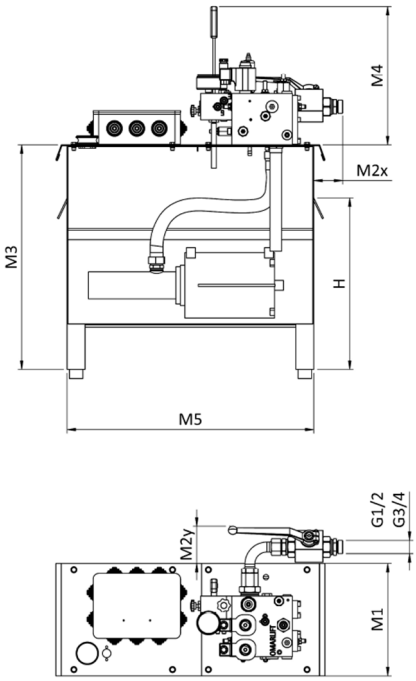
The main valve, belonging to HC family, is available over than in standard 1 or 2 speed versions, starting from 2021, even in a new version named **HC-*HF* valve** (Hi Flux), renewed and optimized in internal fluid dynamics to improve performances, reducing internal losses and increasing the response. This gives most advantages in terms of better stability of installation performances, less oil heating and reduced motor load and current absorption in operating conditions.

Pump unit and valve can be used under Machine Directive 2006/42/CE, or they are matchable with an UCM device, against unintended car movements, in order to satisfy, for instance, the requirements of EN81-41 and EN81-20/50 Normative. As UCM device, OMARLIFT supply HDU valves, certified for braking or redundant applications.

Finally, for applications with machine room not available, OMARLIFT offer specific solutions with dedicated cabinets you can match directly, or even a specific high oil capacity MRL version, you can put directly in the pit.

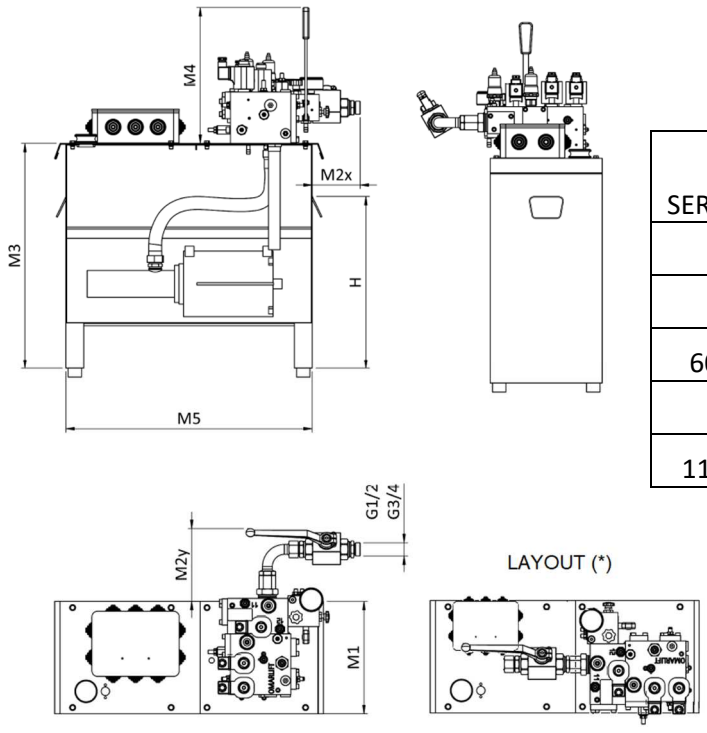
6.2 HOMELIFT PUMP UNIT WITH SUBMERGED MOTOR

6.2.1 WITHOUT HDU VALVE



TANK TYPE	M1	M2 x	M2 y	M3	M4	M5	H
40	300	98	46	330	311	500	-
50/S	250	78	83	500	311	550	-
60/S	300	105	55	525	311	600	420
90/S	300	72	55	702	311	540	627
110/S	300	72	55	702	311	700	640

6.2.2 WITH HDU VALVE (UCM)

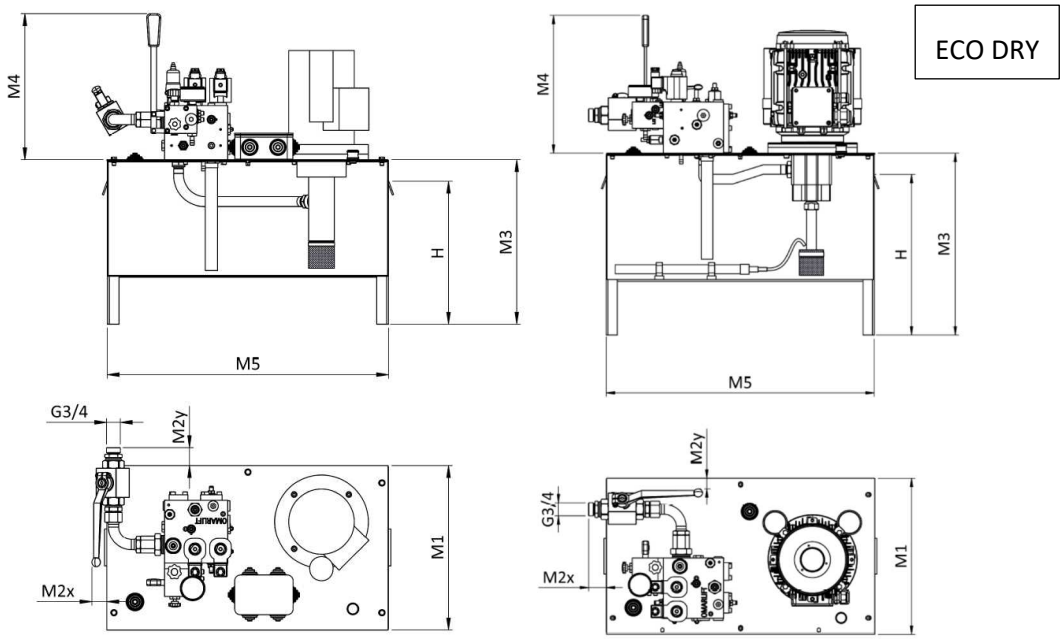


TIPO SERBATOIO	M1	M2 x	M2 y	M3	M4	M5	H
40	300	140	125	330	311	500	-
50/S	250	120	162	500	311	550	-
60/S (*)	300	0	0	525	311	600	420
90/S	300	114	134	702	311	540	627
110/S (*)	300	0	0	702	311	700	640

MOTOR TYPE	50 Hz	60 Hz
NOISE LEVEL HOMELIFT	60 dB(A)	65 dB(A)

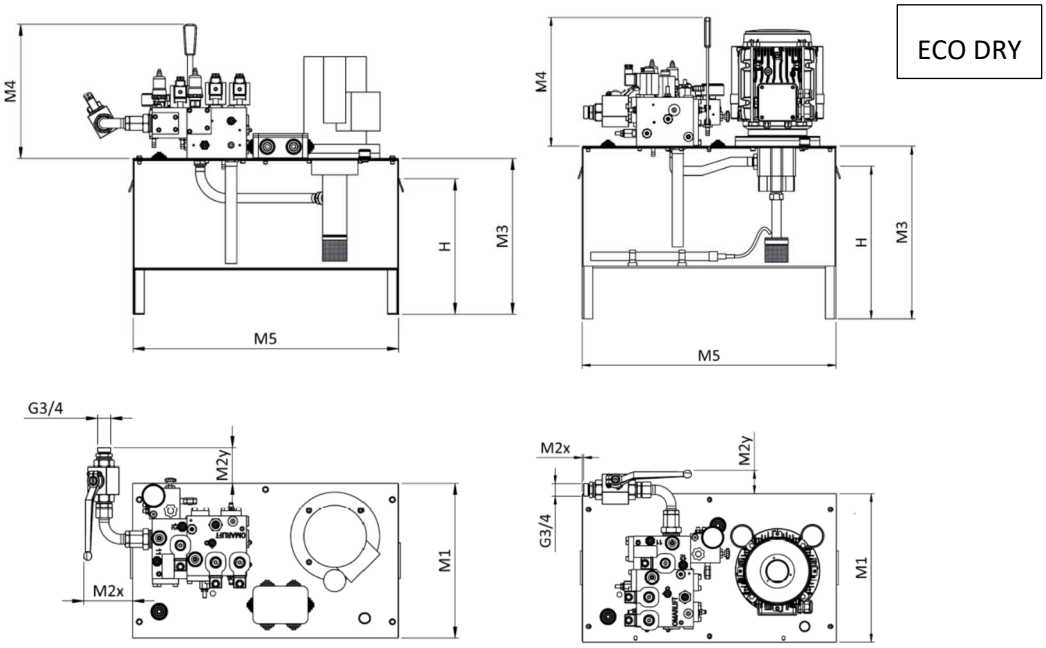
6.3 HOMELIFT PUMP UNIT WITH EXTERNAL MOTOR

6.3.1 WITHOUT HDU VALVE



TANK TYPE	M1	M2x	M2y	M3	M4	M5	H
C40	350	32	51	352	311	600	305
C50	350	32	51	405	311	600	360
ECO	350	52	24	405	311	600	360

6.3.2 WITH HDU VALVE (UCM)



TANK TYPE	M1	M2x	M2y	M3	M4	M5	H
C40	350	111	94	352	311	600	305
C50	350	111	94	405	311	600	360
ECO	350	10	55	405	311	600	360

NOISE LEVEL': 62dB(A) 50Hz – 65dB(A) 60Hz

6.4 CHOICE OF MOTOR PUMP

6.4.1 HOMELIFT SUBMERGED MOTOR

Pump unit type	40, 50/S								60/S, 90/S (*), 110/S (*) except 4,8kW 1AC														50Hz
	12	16			23				30					35						45				Pump [l/min]
Rod Ø [mm]	1,5	1,5	1,8	2,2	1,5	1,8	2,2	2,9	1,8	2,2	2,6	2,9	3,3	2,2	2,6	2,9	3,3	4,1	4,8	2,9	3,3	4,1	4,8	Motor [kW]
	16	16	18	21	16	18	21	27	18	21	24	27	29	21	24	27	29	*35*	41	27	29	*35*	41	1AC 230V [A]
	7,8	7,8	11	12	7,8	11	12	16	11	12	14	16	17	12	14	16	17	*19*	26	16	17	*19*	26	3AC 230V (Delta) [A]
	4,5	4,5	6,5	7	4,5	6,5	7	9,2	6,5	7	8	9,2	10	7	8	9,2	10	*11*	15	9,2	10	*11*	15	3AC 400V (Star) [A]
	55	42	50	55	25	34	43	55	21	28	34	42	48	23	29	35	41	*48*	55	25	30	*39*	48	Static P Max [bar]
50	0,10	0,13			0,19				0,24					0,28						0,36				
60	0,07	0,09			0,13				0,17					0,20						0,25				
70	0,05	0,07			0,09				0,12					0,14						0,19				
80	0,04	0,05			0,07				0,09					0,11						0,14				
85	0,03	0,04			0,06				0,08					0,10						0,13				
90	0,03	0,04			0,06				0,07					0,09						0,11				Rod speed [m/s]
100	-	-			-				0,06					0,07						0,09				
50/2	0,10	0,14			0,20				0,26					0,30						0,39				
60/2	0,07	0,09			0,13				0,18					0,20						0,26				
77/2	0,04	0,06			0,08				0,11					0,13						0,17				
58/3	0,08	0,10			0,15				0,19					0,22						0,28				

Pump unit type	40, 50/S								60/S, 90/S (*), 110/S (*) except 4,8kW 1AC											60Hz
	14,4	19,2			27,6				36						42					Pump [l/min]
Rod Ø [mm]	1,5	1,5	1,8	2,2	1,5	1,8	2,2	2,9	2,2	2,6	2,9	3,3	4,1	4,8	2,6	2,9	3,3	4,1	4,8	Motor [kW]
	18,5	19	20	23	19	20	23	29	23	27	29	34	*35*	45	27	29	34	*35*	45	1AC 230V [A]
	11	11	12	14	11	12	14	17	14	15	17	18	*21*	26	15	17	18	*21*	26	3AC 230V (Delta) [A]
	6,5	6,5	7	8	6,5	7	8	10	8	9	10	11	*12*	15	9	10	11	*12*	15	3AC 400V (Star) [A]
	49	33	43	55	20	27	34	50	22	27	34	39	*47*	55	23	28	33	*41*	51	Static P Max [bar]
50	0,12	0,15			0,22				0,29						0,34					
60	0,08	0,11			0,15				0,20						0,24					
70	0,06	0,08			0,11				0,15						0,17					
80	0,05	0,06			0,09				0,11						0,13					
85	0,04	0,05			0,08				0,10						0,12					
90	0,04	0,05			0,07				0,09						0,10					Rod speed [m/s]
100	-	-			-				0,07						0,08					
50/2	0,12	0,17			0,24				0,31						0,36					
60/2	0,08	0,11			0,16				0,22						0,24					
77/2	0,05	0,07			0,10				0,13						0,16					
58/3	0,10	0,12			0,18				0,23						0,26					

⚠ The current values shown are the rated values on the motor label. Considering the variability of the characteristics of the installations, the operational conditions (oil pressure and temperature), and the construction tolerances for motors and pumps, the speed may be different from the values provided up to 15%.

6.4.2 HOMELIFT EXTERNAL MOTOR

Motors category: S3-10% referred to a cycle time of 10min.

Pump unit type												**50Hz**
	12		16				23				≥ 30	Pump [l/min]
Rod Ø [mm]	1,5	1,8	1,5	1,8	2,2	2,9	1,5	1,8	2,2	2,9	see ECODRY product, chap. 6.5	Motor [kW]
	9,2	-	9	13	15	-	9	13	15	17		1AC 230V [A]
	6,2	-	6,2	7,6	10	-	6,2	7,6	10	13,2		3AC 230V (Delta) [A]
	3,6	-	3,6	4,4	5,8	-	3,6	4,4	5,8	7,6		3AC 400V (Star) [A]
	55	-	41	51	55	-	28	35	42	55		Static Press. Max [bar]
50	0,10		0,13				0,19					Rod speed [m/s]
60	0,07		0,09				0,13					
70	0,05		0,07				0,09					
80	0,04		0,05				0,07					
85	0,03		0,04				0,06					
90	0,03		0,04				0,06					
50/2	0,10		0,14				0,20					
60/2	0,07		0,09				0,13					
77/2	0,04		0,06				0,08					
58/3	0,08		0,10				0,15					

Pump unit type												**60Hz**
	14,4		19,2				27,6				≥ 30	Pump [l/min]
Rod Ø [mm]	1,5	1,8	1,5	1,8	2,2	2,9	1,5	1,8	2,2	2,9	see ECODRY product, chap. 6.5	Motor [kW]
	-	-	-	-	-	-	-	-	-	-		1AC 230V [A]
	6,2	7,6	6,2	7,6	11,4	12,8	6,2	7,6	11,4	12,8		3AC 230V (Delta) [A]
	3,6	4,4	3,6	4,4	6,6	7,4	3,6	4,4	6,6	7,4		3AC 400V (Star) [A]
	46	55	33	40	46	55	23	30	33	44		Static Press. Max [bar]
50	0,12		0,15				0,22					Rod speed [m/s]
60	0,08		0,11				0,15					
70	0,06		0,08				0,11					
80	0,05		0,06				0,09					
85	0,04		0,05				0,08					
90	0,04		0,05				0,07					
50/2	0,12		0,17				0,24					
60/2	0,08		0,11				0,16					
77/2	0,05		0,07				0,10					
58/3	0,10		0,12				0,18					

⚠ The current values shown are the rated values on the motor label. Considering the variability of the characteristics of the installations, the operational conditions (oil pressure and temperature), and the construction tolerances for motors and pumps, the speed may be different from the values provided up to 15%.

6.4.3 MAXIMUM ROD STROKE AND QUANTITY OIL TANKS

The max. travel shown are only in relation to the quantity of useful oil in the various types of tank. The max travel depends from the rod adopted because of the instability limit of buckling. Therefore refer to the respective safety diagrams of the rod.

SUBMERGED MOTOR

Ø Rod [mm]		50	60	70	80	90	100	CT – 2 - 40	CT – 2 – 50
Max rod travel [m]	**40**	9	6	4,7	3,6	2,8	2,2	6,6	4,1
	50/S	11,5	8,2	6	4,6	3,6	2,9	6,3	5,3
	60/S	17	12	8,8	6,7	5,3	4,3	12,5	7,9
	110/S	32,5	23	16,9	12,9	10,2	8,2	24	15

Tank type	Tank capacity[l]	Min oil level [l]	Usable oil [l]
40	39	21	18
50/S	43	20	23
60/S	65	31	34
90/S	77	26	51
110/S	100	35	65

EXTERNAL MOTOR

Ø Rod [mm]		50 x 5	60	70	80	85	90	CT – 2 - 40
Max rod travel [mm]	**C40**	14,5	9,7	7,6	5,7	5,1	4,5	6,3
	C50	20,5	14,5	10,6	8,2	7,2	6,4	15,9

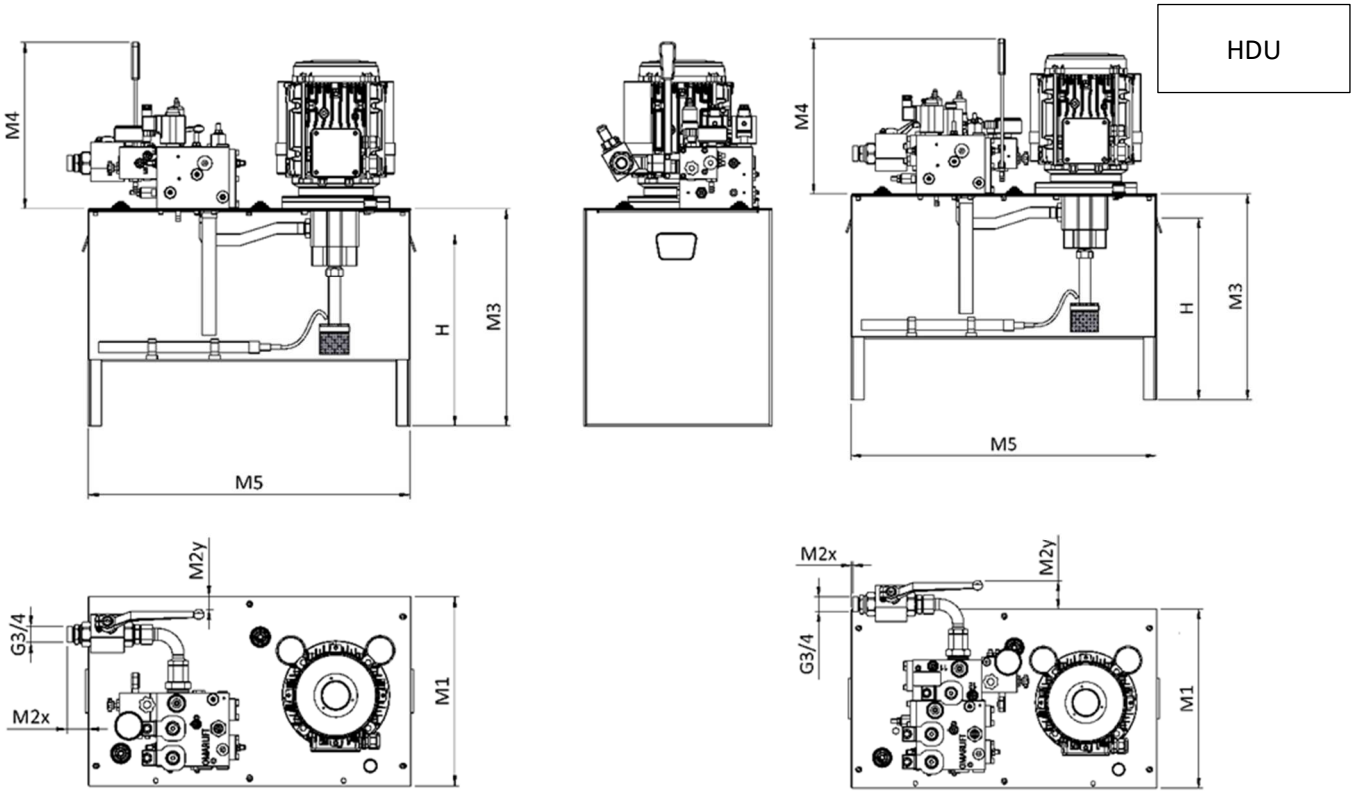
Tank type	Tank capacity [l]	Min oil level [l]	Usable oil [l]
C40	44	15	29
C50	55	14	41

6.5 ECO DRY PUMP UNITS

The Eco Dry pump units are designed and built to be installed in platform lifts, minimizing energy consumption. They are formed by an oil tank with external motor and a helical rotor pump mounted vertically, with the aim to minimize the quantity of oil employed. For dimensions, refer to paragraph 6.3.

The pump unit don't have a wiring box for electrical connections (motor and thermistor), however, it could be supplied on request.

The pump unit can only be provided with direct start; two speed (identified as 2V) and with or without HDU valve for UCM functionality.



Ø ROD [mm]	50Hz					60Hz					
	27	34		42		26,5	33		41		PUMP (l/min)
	2,9	2,9	3,7	2,9	3,7	2,9	2,9	3,7	2,9	3,7	Motor [KW]
	17A	17A	23A	17A	23A	18A	18A	24A	18A	24A	1AC 230V [A]
	45	40	48	32	44	47	40	47	32	44	Max. static press. [bar]
50	0,229	0,289		0,359		0,223	0,274		0,347		ROD SPEED (m/s)
60	0,159	0,201		0,249		0,155	0,191		0,241		
70	0,117	0,148		0,183		0,114	0,140		0,177		
80	0,089	0,113		0,140		0,087	0,107		0,136		
85	0,079	0,100		0,124		0,077	0,095		0,120		
90	0,071	0,089		0,111		0,069	0,085		0,107		
100	0,057	0,072		0,090		0,056	0,069		0,087		
50/2	0,234	0,295		0,364		0,230	0,286		0,355		
60/2	0,162	0,204		0,252		0,159	0,198		0,246		
77/2	0,099	0,125		0,154		0,097	0,121		0,150		
58/3	0,171	0,215		0,266		0,168	0,209		0,260		

⚠ The current values shown are the rated values on the motor label. Considering the variability of the characteristics of the installations, the operational conditions (oil pressure and temperature), and the construction tolerances for motors and pumps, the speed may be different from the values provided up to 15%.

6.5.1 STANDARD DEVICES

In the power pack are included:

- Maximum pressure valve;
- Valve for emergency manual downward travel and valve anti-loosening of ropes;
- Inspectable stainless steel strainer;
- External shut-off valve;
- Emergency hand pump;
- Dipstick;
- Adjustable overload pressure switch;
- Anti-vibrations;
- Length of wires 1,2 m.

Optional:

- Oil temperature safety contact
  It is a bimetallic contact normally closed sensitive to the variation of oil temperature. Automatically it resets in case of intervention. The contact must be protected from oil, dust and moisture.

  Electrical and mechanical characteristics:

Contact type	N.C.	Maximum voltage at 50-60 Hz	250 V
Intervention temperature	70 ± 5 °C	Nominal current at cosφ =1	2.0 A
Reset temperature	>55 ± 5 °C	Nominal current at cosφ =0.6	1.2 A
Maximum temperature	175 °C	Max. current at cosφ =1	4.0 A
Wires section	0.25 mm^2	Short-circuit current	6.3 A
Length of wires	1,2 m	Resistance	< 40 m Ω

6.6 TPU PUMP UNITS

For special applications, OMARLIFT has prepared a specific pump-units line with high compactness and designed with a styled approach, that can offer a good show of themselves in every ambient, so as to allow an exposed position, also in an ambient frequented by people.

Engineered with an elegant cylindrical shape in two parts, the TPU pump units, acronym for Tower Power Unit, have a refined and elegant aesthetic, which well adapts as for solutions of minimal interior design, as for industrial design. The two parts, superposed each other, seem suspended on the air, thanks to hidden position of joining anti-vibrating supports, solution particularly evident in dark colours, and they could be disassembled in case of maintenance operations or motor-pump replacement, in order to facilitate them.

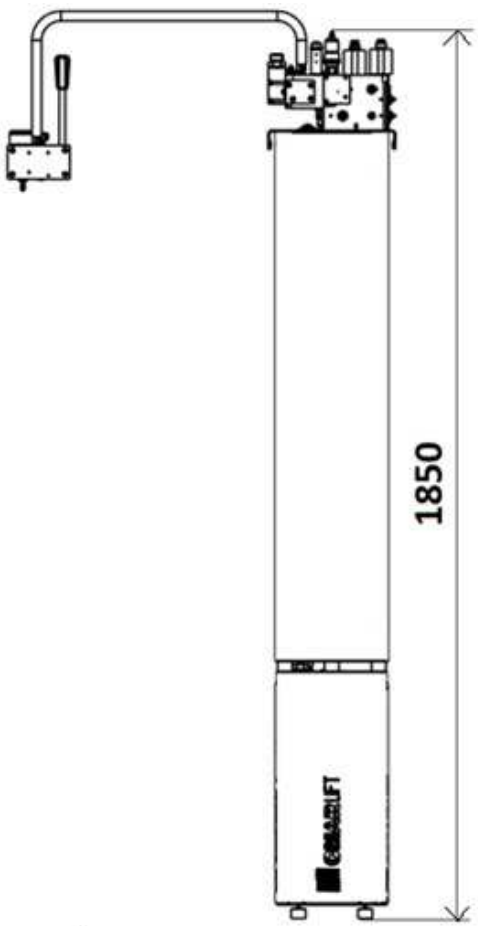
The visual subdivision answers even to functional requirements, with the two parts which comply to specific distinct roles: power unit the bottom part and tank the other. At the top, stands out the function of movement management and safety, assured by the HC valve, available even with an integrated UCM safety device, upon request.

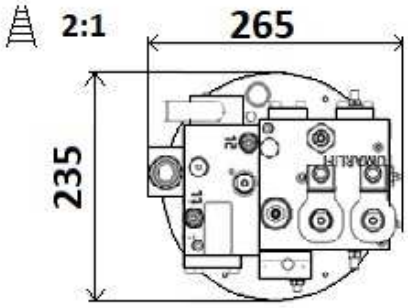
The cooling down of the motor pump group, of external type, was especially evaluated and engineered in order to assure a class of service aligned to the application requirements, and it overtake the S3-10% standard. Two removable carters consent an easy access to the mechanical parts and to the wirings.

The presence of integral carters, consent over than indisputable style advantages, also a protection from unintended contact with hot surfaces, indispensable requirements to be able to place TPU units in people frequented positions.

The TPU performances are completely superposed to those of standard Eco Dry pump units, even for noise.

Multiple solutions of colour and finishing consent to enhance the aesthetic aspect, to differentiate the parts which compose the TPU and to better adapt it to the customer's requirements for full inclusion in the definition and characterization of the environment in which the TPU control unit is positioned, aiming to become an element of furniture and attractiveness.



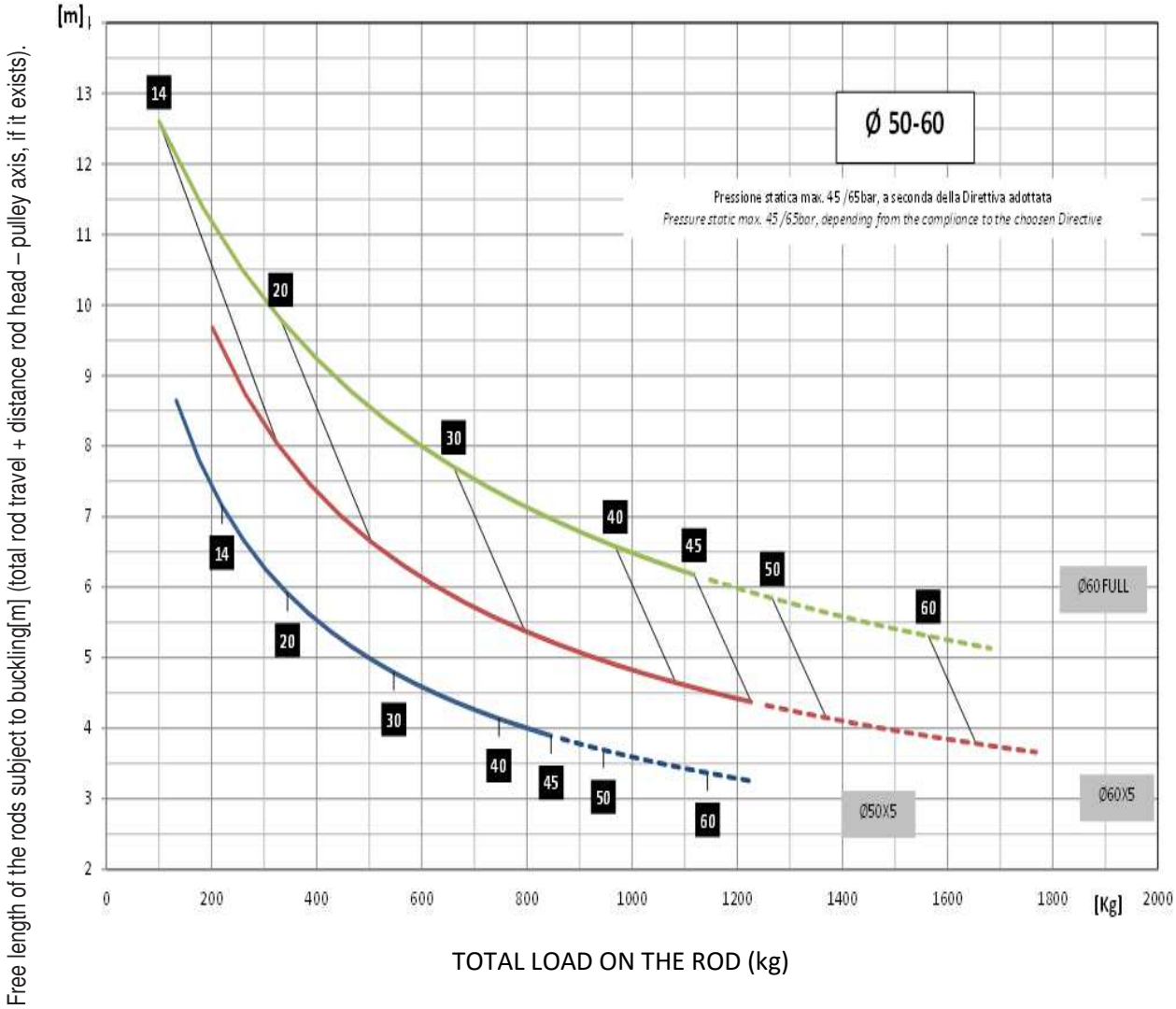


Useful oil tank capacity: 37 litres
Motors 230V 1AC (external type), with intermittent service S3-10% on 10min cycle
Pump with helical rotors

EXTERNAL MOTOR	FREQ	PUMP (l/min)	PRESS MAX Ps (bar)
2.9kW	50Hz	16	50
2.9kW	50Hz	21.3	50
2.9kW	50Hz	26.7	50
2.9kW	50Hz	34.7	39
3.7kW	50Hz	34.7	50
2.9kW	60Hz	19.2	50
2.9kW	60Hz	25.6	50
2.9kW	60Hz	32	43
3.7kW	60Hz	32	50

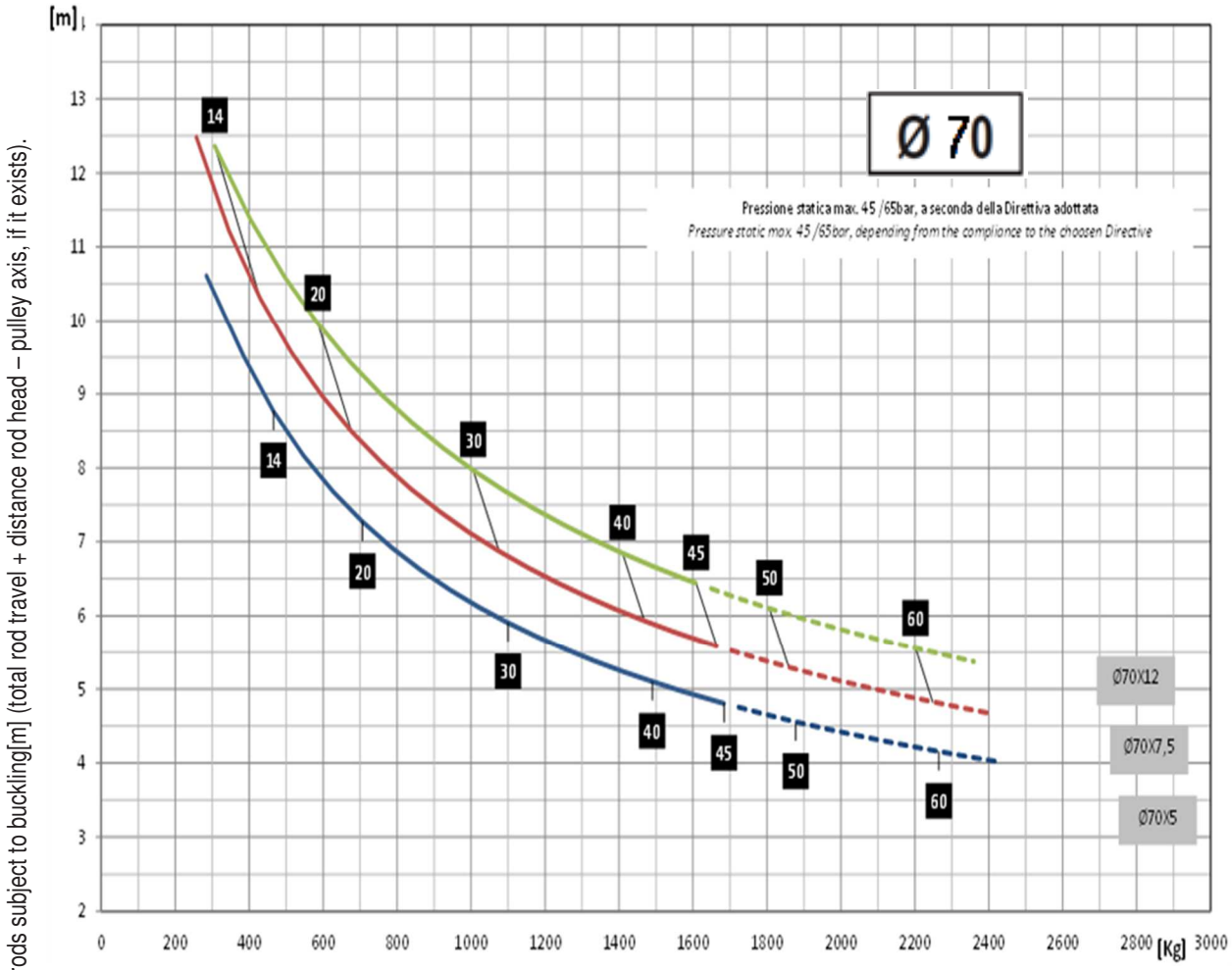
6.7 DIAGRAMS OF THE BUCKLING STRENGTH OF THE ROD ACCORDING TO EN81-2, EN81-20/50

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5 Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



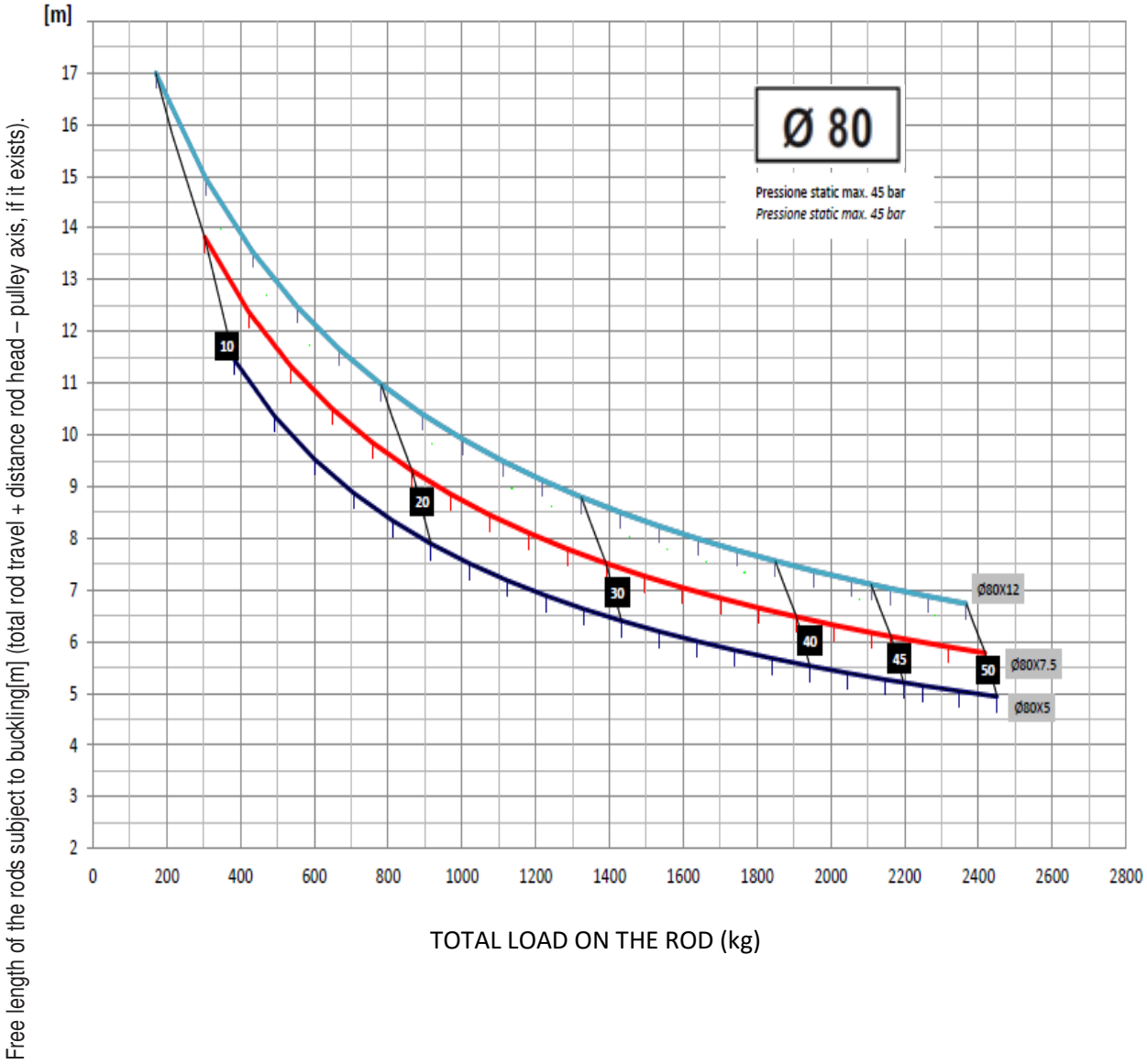
⚠ The graphics are indicative only: if in doubt refer to the analytical calculation.

LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



⚠ The graphics are indicative only: if in doubt refer to the analytical calculation.

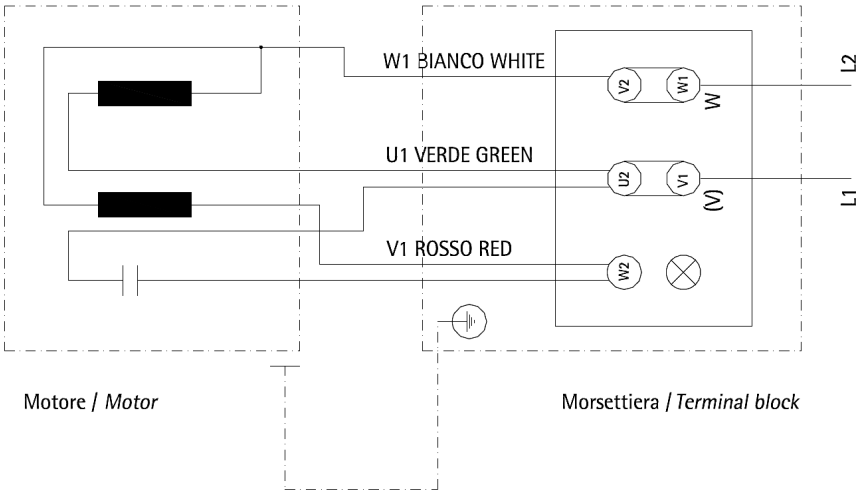
LEGENDA	20 Pressione statica (bar) *Static pressure (bar)*	60 x 5	Ø stelo x spessore (mm) *Ø rod x thickness (mm)*



⚠ The graphics are indicative only: if in doubt refer to the analytical calculation.

6.8 CONNECTION OF THE SINGLE – PHASE MOTOR

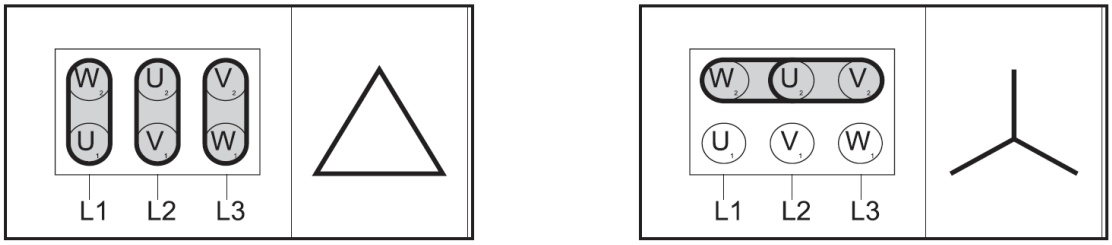
In the single – phase motor the condenser is already connected to the terminal block which is placed inside the box. For a proper motor connection it is necessary to strictly follow the scheme provided by the manufacturer or the scheme reported in Pic. 21.



Pic. 21

6.9 CONNECTION OF THE THREE – PHASE MOTOR

The Homelift three – phase motor is characterized by low power and it is normally started in a direct way. The connection of the three – phase motor can be a star connection or a delta one, according to the case. The setting of the connection bands, in both cases, is reported in Pic. 22.

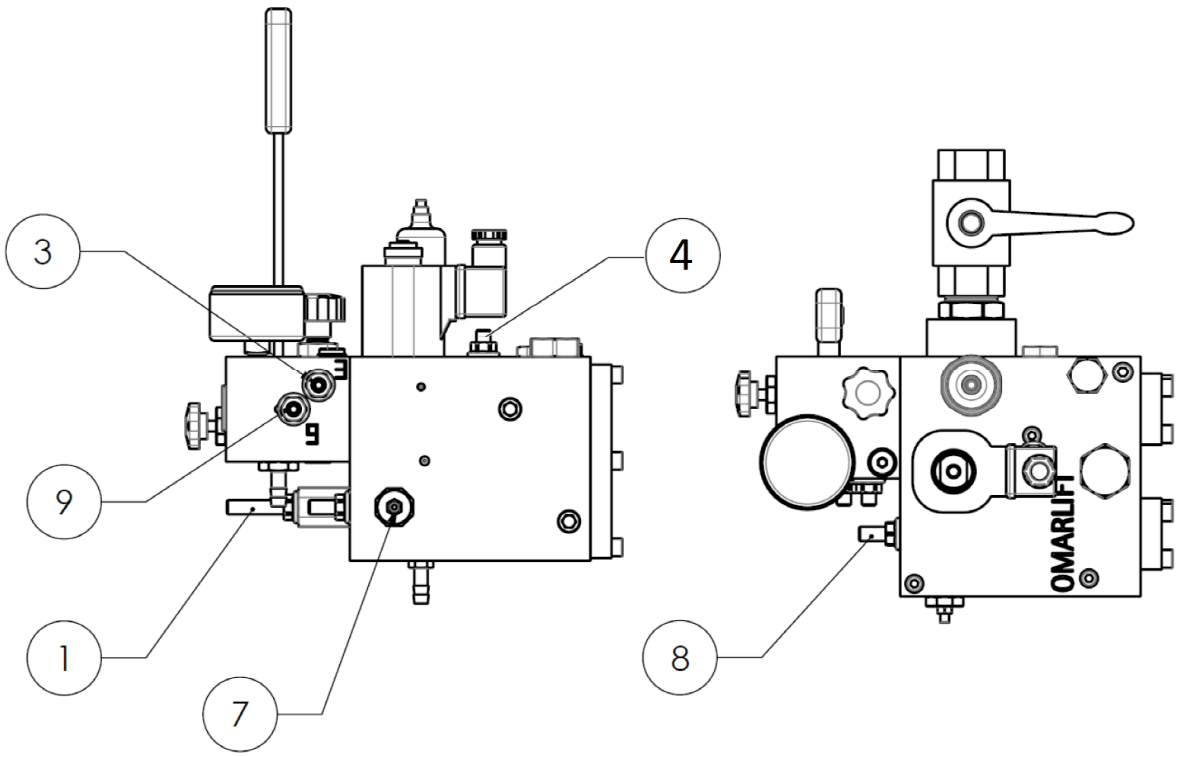


Pic. 22

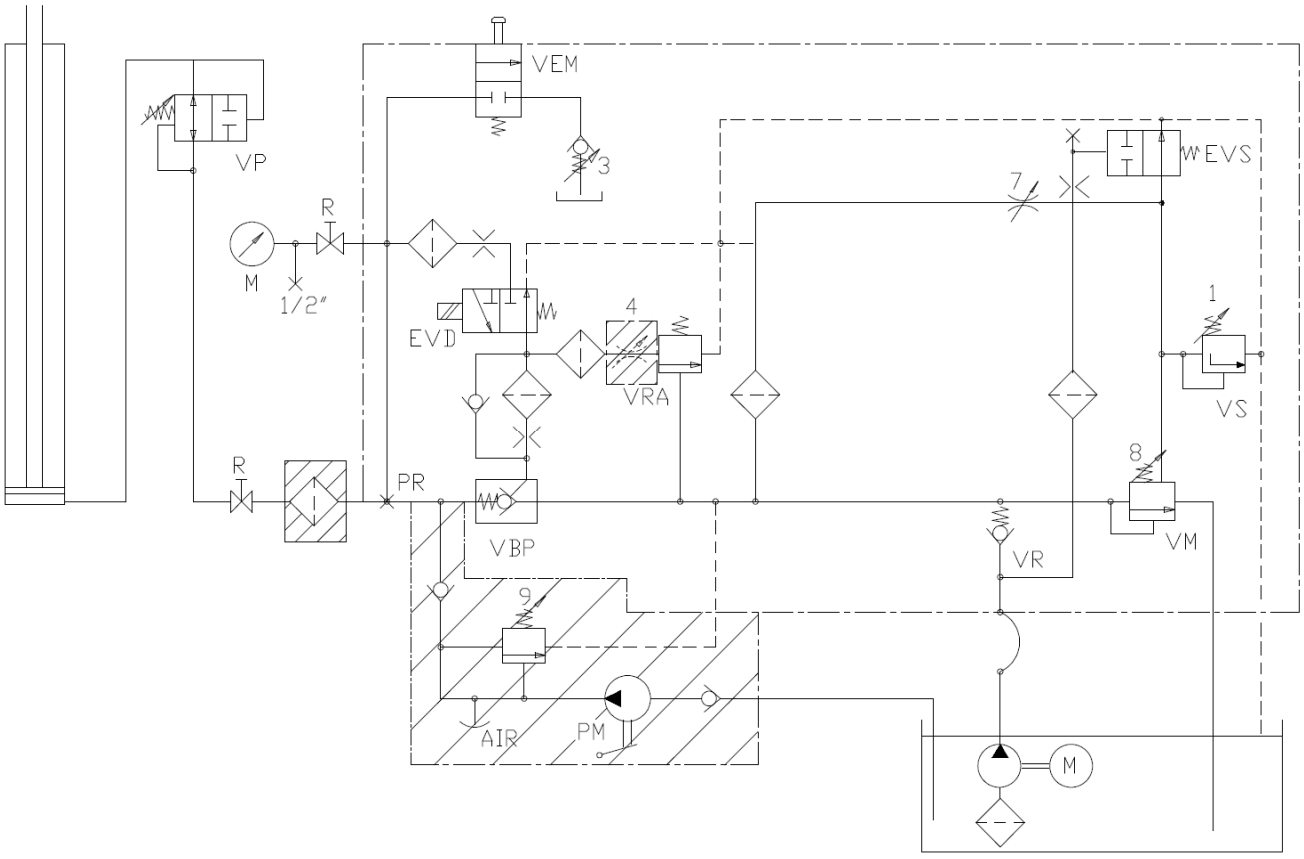
⚠ ATTENTION: for further information on Homelift project, installation and maintenance refer to operating instruction manual D843MITGB.

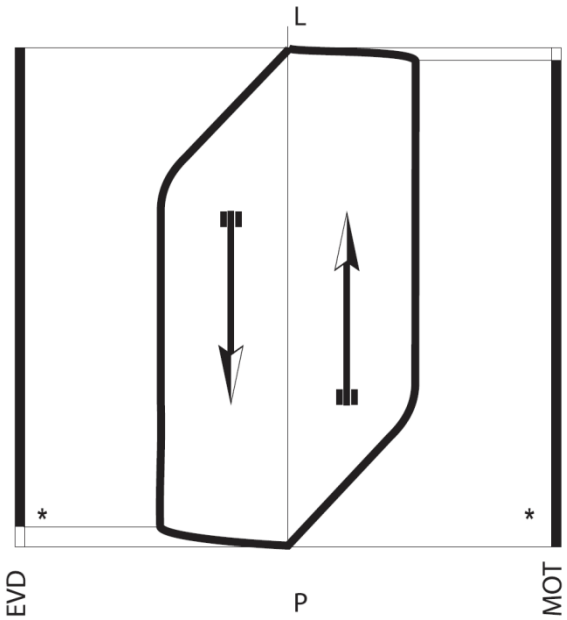
6.10 HOMELIFT SPEED REGULATION (V1)

REGULATION TABLE OF HOMELIFT VALVE (HC V1 VALVE)		
SCREW	DESCRIPTION	REGULATIONS
N° 1	Adjusting of the valve max pressure	Screw to increase max pressure Unscrew to decrease max pressure
N° 3	Rod counter – pressure and rope anti – loosening device adjusting	Screw to have not rod drop with emergency button pressed Unscrew to have rod drop with emergency button pressed
N° 4	VP Reaction test	Screwing completely the car tends to exceed the nominal speed
N° 7	Choke device for pressure activation and upward start	Screw to delay the pressure activation with a consequent smooth start Unscrew to obtain an immediate pressure activation with a consequent quick start
N° 8	High speed regulator for DOWN travel	Screw to decrease the downward speed Unscrew to increase the downward speed
N° 9	Hand pump pressure adjusting	Screw to increase the hand pump adjusting pressure Unscrew to decrease the hand pump adjusting pressure



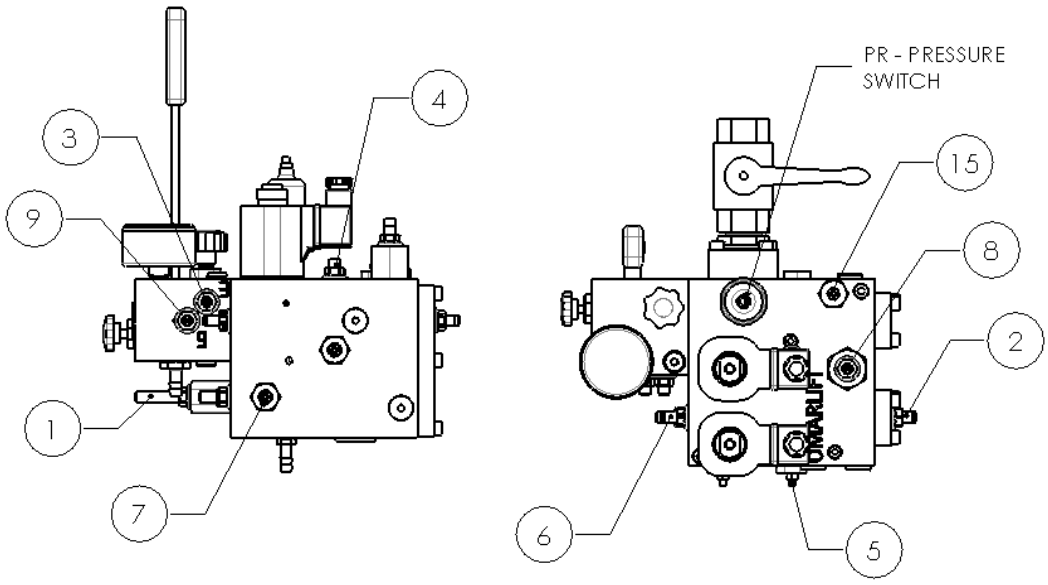
6.11 HOMELIFT 1 SPEED HYDRAULIC AND SPEED SCHEME



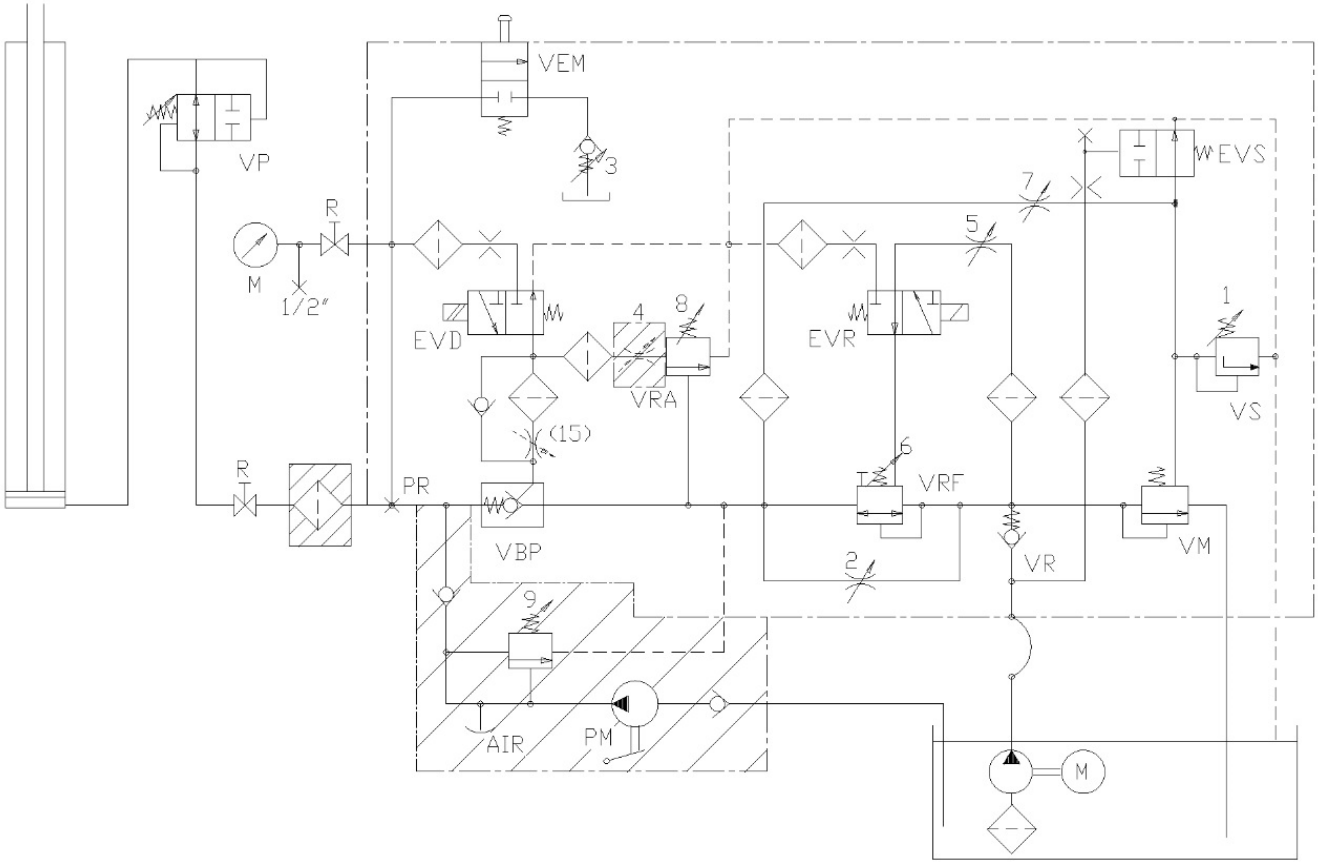


6.12 HOMELIFT 2 SPEEDS REGULATION (V2)

REGULATION TABLE OF HOMELIFT VALVE (HC V2 VALVE)		
SCREW	DESCRIPTION	REGULATIONS
N° 1	Adjusting of the valve max pressure	Screw to increase max pressure Unscrew to decrease max pressure
N° 2	Upward and downward low speed regulation	Screw to increase low speed Unscrew to decrease low speed
N° 3	Rod counter–pressure and rope anti–loosening device adjusting	Screw to have not rod drop with emergency button pressed Unscrew to have rod drop with emergency button pressed
N° 4	VP Reaction test	Screwing completely the car tends to exceed the nominal speed
N° 5	Choke device for the deceleration from high to low speed in upward and downward directions	Screw to make the car brake more slowly Unscrew to make the car brake more quickly
N° 6	High speed limiter	Screw to reduce the upward speed Unscrew to increase the upward speed up to the max allowed by the pump
N° 7	Choke device for pressure activation and upward start	Screw to delay the pressure activation with a consequent smooth start Unscrew to obtain an immediate pressure activation with a consequent quick start
N° 8	Down high speed regulator	Screw to increase the downward speed Unscrew to decrease the downward speed
N° 9	Hand pump pressure adjusting	Screw to increase the hand pump adjusting pressure Unscrew to decrease the hand pump adjusting pressure
N° 15	Adjusting of downward start	Screw to smooth start Unscrew to quick start

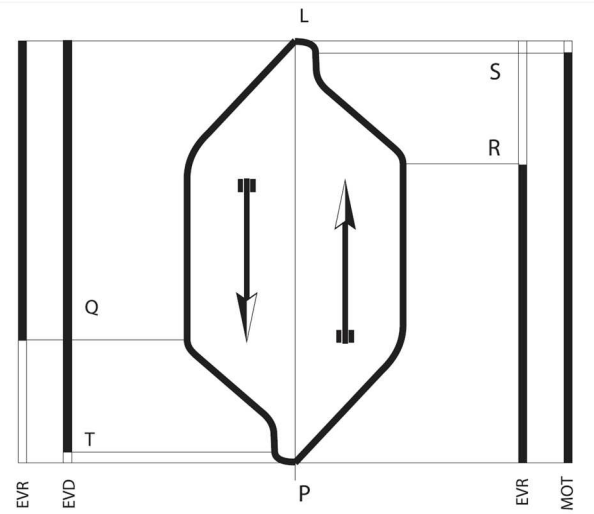


6.13 HOMELIFT 2 SPEEDS – HYDRAULIC AND SPEED SCHEME



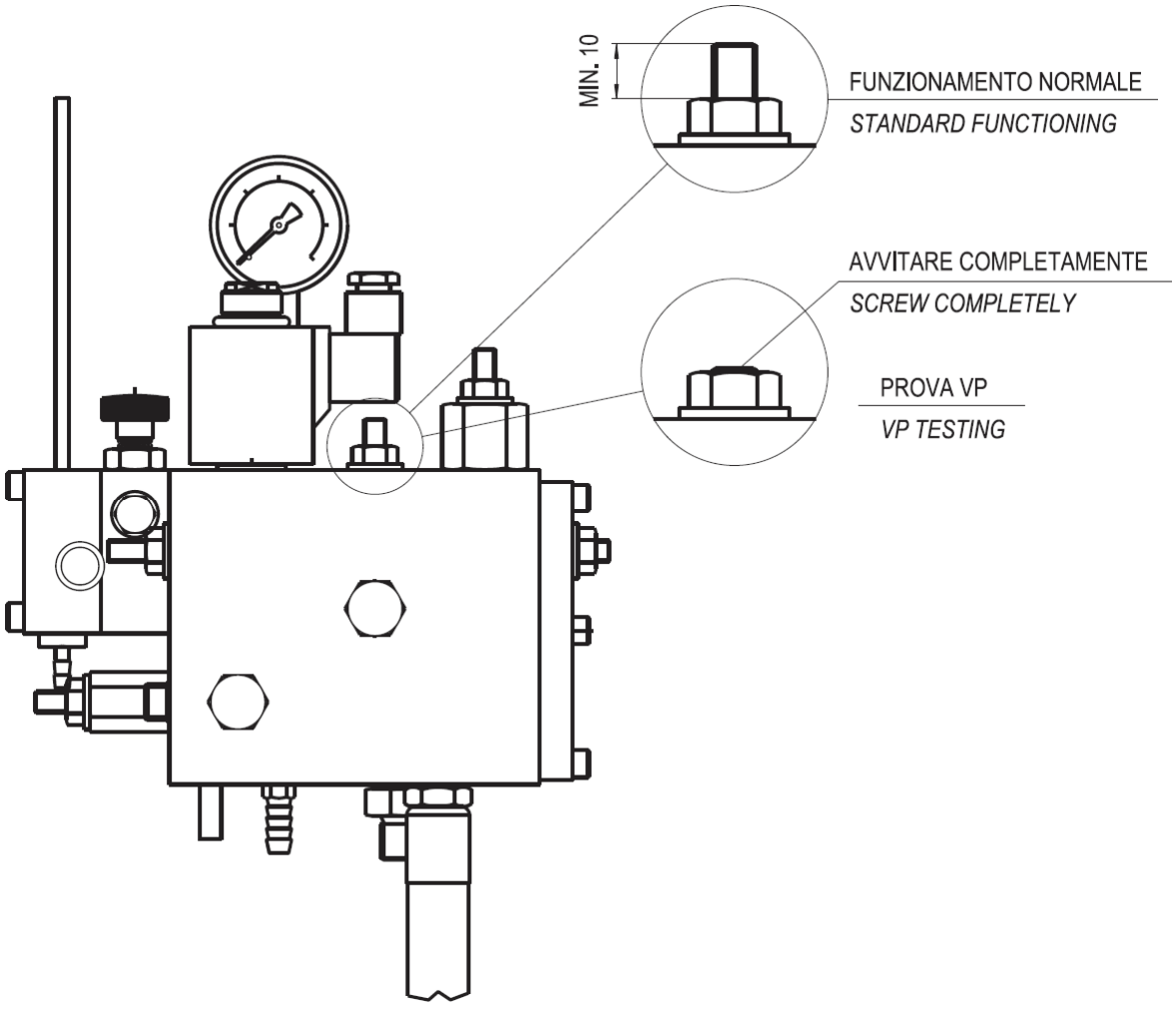
LEGENDA

VR	=	Non–return valve.
VM	=	Max. pressure valve.
VS	=	Safety valve.
VRF	=	Flow – regulation valve.
VRA	=	Down travel balancing valve.
VBP	=	Pilot block valve.
EVD	=	Down travel electrovalve.
EVR	=	Flow – regulator electrovalve.
EVS	=	Up travel electrovalve.
VEM	=	Emergency.
VP	=	Rupture valve.
FR	=	Shut – off valve.
M	=	Manometer.
PM	=	Hand pump.
PR	=	Inlet for the pressure switch.
R	=	Shut – off valve and inlet 1/2" Gas for the control manometer.
1, 2,…	=	Number of regulating screws



6.14 SCREW N° 4 – VALVE TEST VP

The valve block of the Homelift pump unit is equipped with the screw n° 4. This device allows the testing of rupture valve intervention. In fact, screwing completely the screw n° 4 the car will tend to exceed the nominal speed without being controlled by the valve group, thus causing the rupture valve intervention.



⚠ ATTENTION: After the rupture valve test, place the screw on the original position as you can see in the Pic., to guarantee a correct operation of the installation.

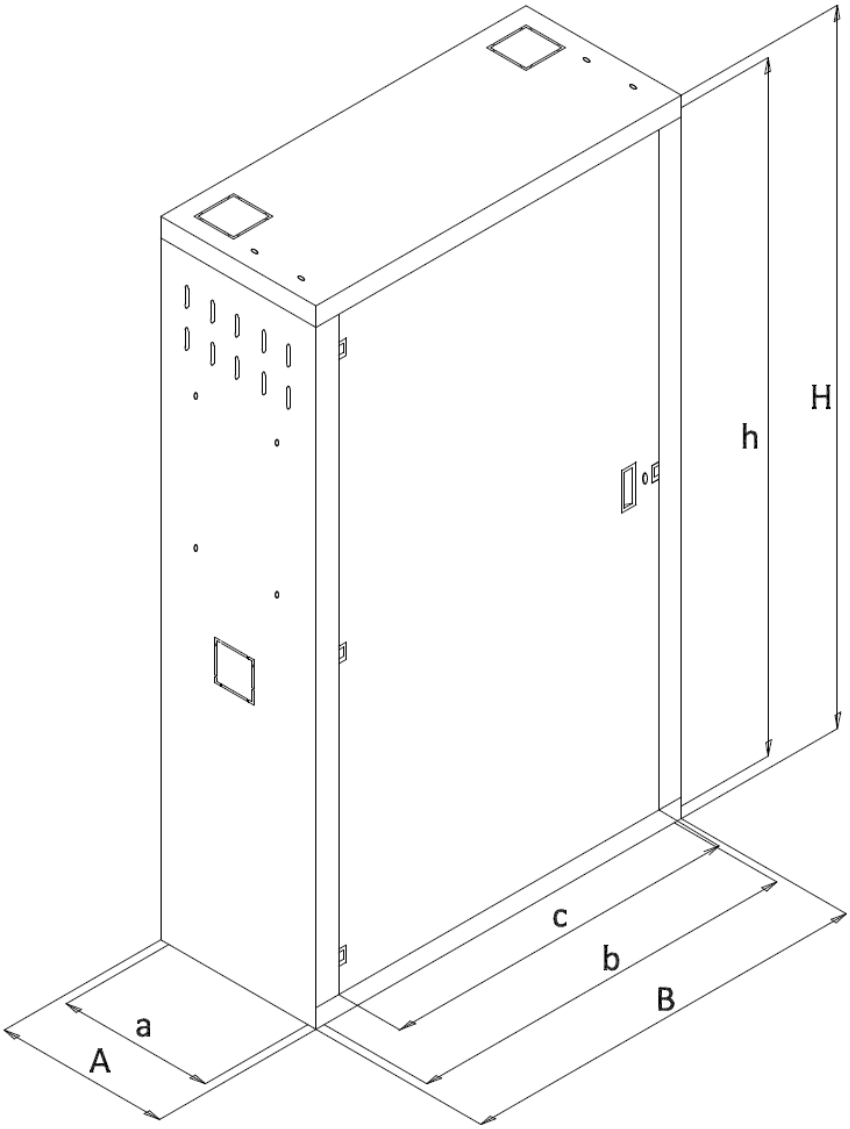
6.15 HOMELIFT PACKAGE

The Homelift pump units tanks are projected to facilitate their handling through forklifts, moreover it's not necessary to use pallets for their packaging.
OMARLIFT supplies Homelift pump units with standard package composed by a cardboard protection for the valve block and the electrical box, and by a film of thermo–shrinking plastic. This type of package is free of charge and always used unless differently required by the Customer. Optional are the multiple packaging on one only pallet and the wood cages, both shown in the pictures below. For detailed information and quotations on these packages address to OMARLIFT Sales Department.

Dimension of package with EURO pallet		
Length	Depth	H
1200 mm	800 mm	900 mm

6.16 MRL HOMELIFT CABINET

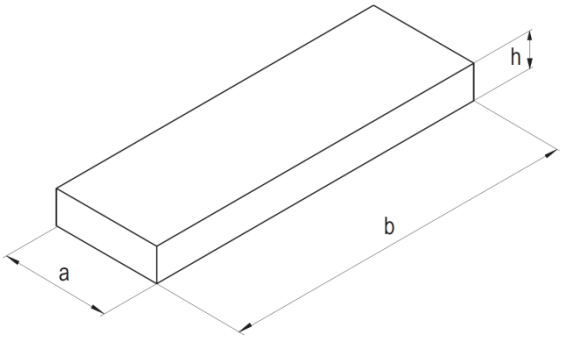
OMARLIFT proposes also a model of machine room cabinet for Homelift pump units. It is supplied single door with reversible opening, in plate painted RAL 7032, with internal light, screws and bolts, standard packaging and assembling instructions.
For requests as lead time and special cabinets please contact OMARLIFT Sales Department.



CODICE	EXTERNAL DIMENSIONS (mm)			INTERNAL DIMENSIONS (mm)			ACCESS		REMARKS
	A	B	H	a	b	h	C	nr	
8H203099	410	730	1550	360	710	1530	670	1 door	NO HDU
8H202437	520	800	1550	470	780	1530	740	2 doors	HDU

6.17 HOMELIFT MACHINE ROOM CABINET PACKAGING

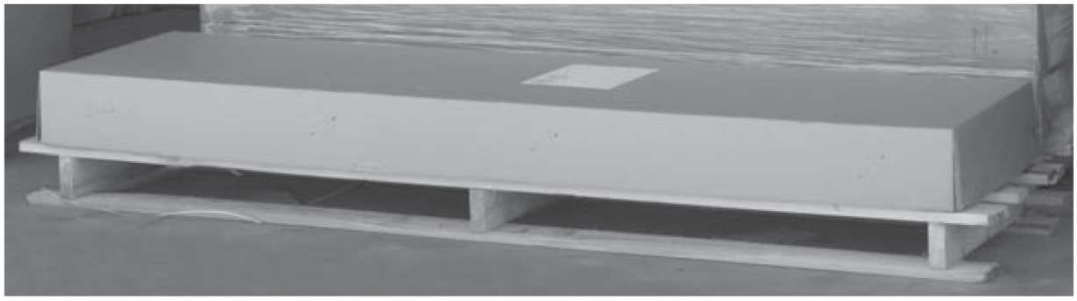
The Homelift machine room cabinets are supplied with a standard packaging in cardboard. Upon specific request from the Customer, it's possible to supply many cabinets piled on a pallet or one single cabinet on a pallet. For special requests contact the Sales Department OMARLIFT.



Imballo standard per Armadio
Standard package for Cabinet

Dimension of package		
a	b	h
740 mm	1600 mm	120 mm

Dimensioni imballo soggette a variazione



Imballo armadio minilift
Minilift cabinet package

7 SYNCHRONIZED TELESCOPIC CYLINDERS

7.1 GENERAL INFORMATION

In 2020, OMARLIFT introduced a new range of telescopic cylinders produced in Italy. They are single-stage synchronized cylinders produced in two stages CT – 2 version and three stages CT – 3 version. Both versions are available for applications like side direct and central direct acting. Their overall dimension length, very reduced compared with the travel, allows their use in little spaces or where it is impossible to practice very deep holes on the floor or in the spaces under the lift. The synchronization of OMARLIFT telescopic cylinders is the hydraulic one, through internal rooms. During the normal running of the installation, the pump until oil is in communication only with the biggest stage, while the smallest ones move through the oil contained in the internal rooms, that have to be filled in beforehand. The oil in the internal rooms can pass from a closed room to the following piston one through some holes, but it cannot go from an upper room to a lower one. Only when the cylinder is completely closed on itself, the non – return valves positioned on the stages bottoms, open mechanically and let the internal rooms fill up. Only when the internal rooms of the telescopic cylinder are completely full, the movement of all the stages is contemporaneous and the cylinder is synchronized for all its travel.

In order to carry out in the proper way the installation, the filling up and the synchronization of the telescopic cylinders, please refer to the “Operating instructions manual” D840M. in the telescopic cylinders, a little lack of synchronism between the rods can be remarked anyway, due to oil losses or leakages together with the different internal pressures of the rooms and the different oil temperature in the rooms. The above mentioned displacements are normally recovered through a correct distribution of the extra travel which we recommend not lower than the following values:

⚠ ATTENTION: Comply mandatorily to the mentioned extra-travel values, for a satisfactory cylinder operation and in order to assure the re-synchronization:

- **TWO STAGES CYLINDER (CT2): total extra travel 250 mm minimum, of which 100 mm at the bottom and 150 mm at the top.**
- **THREE STAGES CYLINDER (CT3): total extra travel 350 mm minimum, of which 100 mm at the bottom and 250 mm at the top.**

The non-observance of the correct distribution of the extra travels, or the non-filling up and synchronization of the cylinder jeopardize completely or partially the installation functioning.

⚠ For the synchronization procedure, refer to paragraph 5.11.4.

7.2 TELESCOPIC CYLINDER AND PUMP UNIT SELECTION

The telescopic cylinder selection is carried out through the safety graphs reported in following section, but it is always required a verification with analytical calculation of operating conditions. For each cylinder the graphs provide the utmost limit of the total travel on the basis of the total load on the top of the cylinder itself and of the number of guides on intermediate stages head for increase the stability.

The graphs don't include the weight of the possible guiding arm; the respective load has to be added in the evaluation of total weight acting on the top of the rod.

In case of choice of cylinder with guides connections, while the guide arms must be supplied by the Customer, and installed following absolutely the safety distances indicated by EN 81.2 or by EN 81-20/50 (free distance ≥ 0,3 m between subsequent guiding jokes and between upper yoke and lower car parts, when the car leans on its dampers fully compressed).
In the cylinder choice also the correct pressure values have to be taken into consideration, values that can be read in the graphs:

- Minimum pressure at empty car: 14 bar.
- Maximum pressure at full load: refer to detailed values for each piston

⚠ Graphs values are indicative only: refer always to the analytical evaluation of operating conditions. Max pressure available for each cylinder is shown in the tables of paragraphs 7.3 and 7.4

Moreover, in the graph pages of each cylinder it is possible to read and calculate the total oil quantity necessary for the cylinder movement and filling up.

The choice of the pump unit is made through the tables as follow:

- On the base of cylinder chosen and of the required speed, you can define the pump unit flow rate with motor 50 or 60 Hz
- The motor power to link to the previously determined pump is chosen according to the maximum static pressure at full load. The motor power reported in the tables according to the pump and the maximum static pressure refers to average traffic conditions and to connection pipe lengths not longer than 7/8 meters. For very considerable traffic conditions, connection pipes length longer than 7/8 meters or for cars guided in asymmetric way where pressure losses and the frictions are high, it is necessary to consider the single pressure decreases and add their sum to the static pressure determined from the graphs.

ROD DIAMETER (mm)	HC	NL 210																																NL 380									NL 600										max. Static Press Cylinder (bar)	VALVE TYPE	
	1/2"- 3/4"	1 1/4"																														1 1/2"									2"									2"				
	30	35-45	55			75			100				125					150					180				210					250				300				380				500					600						CONNECTION
			4,5	6,5	8,0	6,5	8	10,5	6,5	8,0	11	13	8,0	11	13	15	17	20	11	13	15	17	20	15	17	20	25	15	17	20	25	30	20	25	30	40	20	25	30	40	25	30	40	50	30	40	50	60	70	40	50	60	70	80	PUMP l/min	
			3,3	4,8	5,9	4,8	5,9	7,7	4,8	5,9	7,7	9,6	5,9	7,7	9,6	11,0	12,5	14,7	7,7	9,6	11,0	12,5	14,7	11,0	12,5	14,7	18,4	11,0	12,5	14,7	18,4	22,1	14,7	18,4	22,1	29,4	14,7	18,4	22,1	29,4	18,4	22,1	29,4	36,8	22,1	29,4	36,8	44,1	51,5	29,4	36,8	44,1	51,5	58,8	HP MOTOR kW MOTOR	
			22	34	45	24	35	45	16	24	34	45	18	26	34	40	43	45	20	27	32	39	45	24	29	34	45	19	25	28	37	45	23	30	38	45	18	24	30	45	12	22	32	45	15	22	30	37	45	15	21	28	34	45	Max. Static Press. Motor (bar)	
46/2	refer to HOMELIFT products, see Chapter 6	0,55			0,75			1,00				-						-					-				-					-				-				-				-					-					**42**	2 STAGES TELESCOPIC	ROD SPEED m/s 2 POLES MOTOR 2750 g/min
50/2		0,48			0,65			0,87				1,09						-					-				-					-				-				-				-					-					**50**		
60/2		0,32			0,43			0,59				0,72						0,88					1,06				-					-				-				-				-					-					**44**		
77/2		0,19			0,26			0,35				0,43						0,53					0,63				0,73					0,88				1,05				-					-					-					**43**		
85/2		0,16			0,22			0,29				0,36						0,44					0,53				0,60					0,74				0,88				1,05				-					-					**44**		
103/2		0,11			0,15			0,20				0,25						0,30					0,36				0,41					0,50				0,61				0,77				1,01					1,21					**45**		
120/2		0,08			0,10			0,15				0,18						0,22					0,26				0,30					0,37				0,44				0,56				0,73					0,88					**42**		
141/2		-			0,08			0,11				0,13						0,16					0,19				0,22					0,27				0,32				0,40				0,53					0,64					**45**		
170/2		-						0,07				0,09						0,11					0,13				0,15					0,18				0,22				0,28				0,37					0,44					**42**		
205/2		-			-			0,05				0,07						0,08					0,09				0,10					0,13				0,15				0,19				0,25					0,30					**42**		
58/3		0,35			0,48			0,64				0,79						0,95					1,15				-					-				-				-				-					-					**27**	3 STAGES TELESCOPIC (LV=high pressure version)	
75/3		0,21			0,27			0,38				0,46						0,57					0,68				0,77					0,94				1,13				-				-					-					**30**		
98/3		0,12			0,16			0,22				0,27						0,33					0,40				0,45					0,55				0,66				0,84				1,10					-					**32**		
107/3		0,10			0,14			0,19				0,22						0,28					0,33				0,38					0,47				0,56				0,71				0,93					1,12					**29**		
127/3		-			0,10			0,13				0,16						0,20					0,24				0,27					0,33				0,39				0,50				0,66					0,79					**30 42LV**		
150/3		-			-			0,09				0,11						0,14					0,17				0,19					0,24				0,28				0,36				0,47					0,57					**29 41LV**		
176/3		-			-			-				0,08						0,10					0,12				0,14					0,17				0,21				0,26				0,34					0,41					**32 44LV**		

* = Single phase motor also available
LV= 3 stages cylinder high pressure version

50 Hz

⚠ The current absorption values shown are the rated values on the motor label. Considering the variability of the characteristics of the installation, the operational condition (pressure and temperature), and the construction tolerances for motors and pumps, the speed may be different from the values provided up to 15%.

ROD DIAMETER (mm)	HC		NL 210																				NL 380												NL 600								max. Static Press Cylinder (bar)	VALVE TYPE	
	1/2" - 3/4"		1 1/4"																1 1/2"												1 1/2"				2"				2"					CONNECTION	
	36	42	65			90				120						150					180					215					250				300				360				455				600					PUMP l/min	
	refer to HOMELIFT products, see Chapter 6		6,5	8	10,5	6,5	8	10,5	13	8	10,5	13,0	15,0	17	20	10,5	13	15	17	20	13	15	17	20	25	15	17	20	25	30	20	25	30	40	20	25	30	40	25	30	40	50	30	40	50	60	40	50	60	70	80		HP MOTOR kW MOTOR	
			4,8	5,9	7,7	4,8	5,9	7,7	9,6	5,9	7,7	9,6	11,0	12,5	14,7	7,7	9,6	11,0	12,5	14,7	9,6	11,0	12,5	14,7	18,4	11,0	12,5	14,7	18,4	22,1	14,7	18,4	22,1	29,4	14,7	18,4	22,1	29,4	18,4	22,1	29,4	36,8	22,1	29,4	36,8	44,1	29,4	36,8	44,1	51,5	58,8			
			23	36	45	15	24	35	45	15	23	32	38	41	45	18	24	30	38	45	18	23	28	32	45	17	22	26	34	45	22	29	36	45	16	22	32	45	17	22	32	45	16	24	32	45	15	21	27	33	45		Max. Static Press. Motor (bar)	
46/2			0,66			0,90				1,20						-					-					-					-				-				-				-				-					**42**	2 STAGES TELESCOPIC	ROD SPEED m/s 2 POLES MOTOR 3300 g/min
50/2			0,58			0,78				1,04						1,31					-					-					-				-				-				-				-					**50**		
60/2			0,38			0,52				0,71						0,86					1,27					-					-				-				-				-				-					**44**		
77/2			0,23			0,31				0,42						0,52					0,76					0,88					1,06				1,26				-				-				-					**43**		
85/2			0,19			0,26				0,35						0,43					0,64					0,72					0,89				1,06				1,26				-				-					**44**		
103/2			0,13			0,18				0,24						0,30					0,43					0,49					0,60				0,73				0,92				1,21				1,45					**45**		
120/2			0,10			0,12				0,18						0,22					0,31					0,36					0,44				0,53				0,67				0,88				1,06					**42**		
141/2			-			0,10				0,13						0,16					0,23					0,26					0,32				0,38				0,48				0,64				0,77					**45**		
170/2			-							0,08						0,11					0,16					0,18					0,22				0,26				0,34				0,44				0,53					**42**		
205/2			-			-				0,06						0,08					0,11					0,12					0,16				0,18				0,23				0,30				0,36					**42**		
58/3			0,42			0,58				0,77						0,95					1,38					-					-				-				-				-				-					**27**	3 STAGES TELESCOPIC (LV=high pressure version)	
75/3			0,25			0,32				0,46						0,55					0,82					0,92					1,13				1,36				-				-				-					**30**		
98/3			0,14			0,19				0,26						0,32					0,48					0,54					0,66				0,79				1,01				1,32				-					**32**		
107/3			0,12			0,17				0,23						0,26					0,40					0,46					0,56				0,67				0,85				1,12				1,34					**29**		
127/3			-			0,12				0,16						0,19					0,29					0,32					0,40				0,47				0,60				0,79				0,95					**30 42LV**		
150/3			-			-				0,11						0,13					0,20					0,23					0,29				0,34				0,43				0,56				0,68					**29 41LV**		
176/3			-			-				-						0,10					0,14					0,17					0,20				0,25				0,31				0,41				0,49					**32 44LV**		

* = Single phase motor also available
LV= 3 stages cylinder high pressure version

60 Hz

⚠ The current absorption values shown are the rated values on the motor label. Considering the variability of the characteristics of the installation, the operational condition (pressure and temperature), and the construction tolerances for motors and pumps, the speed may be different from the values provided up to 15%.

7.5 TELESCOPIC CYLINDER WEIGHT

Weight for each travel meter x TRAVEL + FIX WEIGHT (kg)

The cylinder weight is calculated by multiplying the cylinder run in metres per the weight/metre, plus the fix weight. The fix weight of the telescopic cylinders is strongly influenced by some variants which depend on the run of the cylinder itself:

Presence or not of guide arms.

Length of internal spacers for the synchronism.

Different size of the rupture valve etc.

NB: THE THEORETICAL WEIGHT DRAWN FROM THE TABLES CAN BE LIGHTLY DIFFERENT FROM THE REAL WEIGHT OF THE TELESCOPIC CYLINDER.

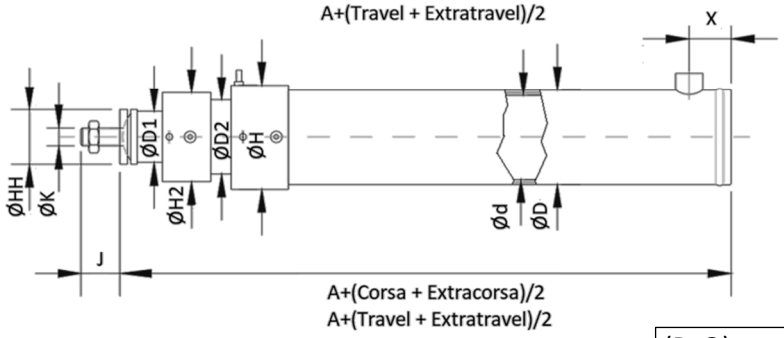
2 STAGES MODEL	**46/2**	**50/2 HOME**	**60/2 HOME**	**60/2**	**77/2**	**85/2**	**103/2**	**120/2**	**141/2**	**170/2**	**205/2**
Weight/ meter_travel [kgf/m]	13.5	15	17	19.8	35	38.3	43.3	52	80.1	91.9	116.2
Fixed weight direct central acting [kgf]	57	-	-	65	100	100	140	200	245	340	470
Fixed weight direct side acting [kgf]	28	40	47	36	84	64	98	149	193	267	364
Oil filling/ meter_travel [l/m]	2.5	1.9	4.2	4.2	7	8.5	12.2	17.1	23.4	33.6	49
Oil movement/ meter_travel [l/m]	1.7	2.8	2.8	2.8	4.8	5.7	8.3	11.4	15.7	49	33

3 SAGES MODEL	**58/3**	**75/3**	**98/3**	**107/3**	**127/3**	**150/3**	**176/3**
Weight/ meter_travel [kgf/m]	16.8	24.2	35	53.6	52.6	83.7	122.3
Fixed weight direct central acting [kgf]	80	110	160	200	275	416	560
Fixed weight direct side acting [kgf]	52	75	125	155	227	345	472
Oil filling/ meter_travel [l/m]	5.1	7.9	13.1	15.5	21.7	30.7	41.9
Oil movement/ meter_travel [l/m]	2.6	4.4	7.6	9	12.7	17.7	24.4

7.6 TELESCOPIC CYLINDERS 2 STAGES

CENTRALE
CENTRAL ACTING

LATERALE
SIDE ACTING



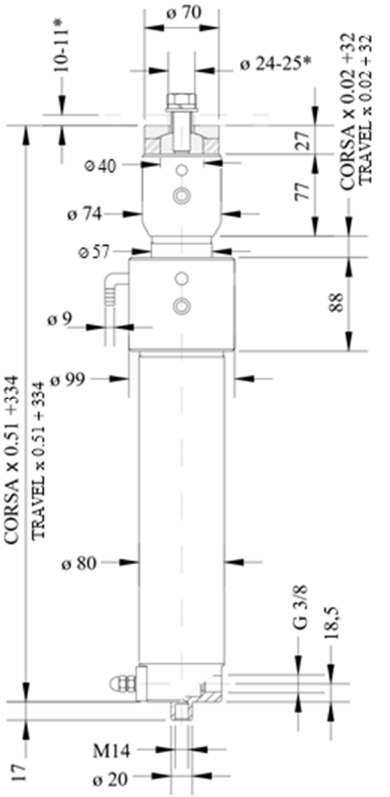
STATIC PRESSURE: $P_S = \frac{[(P+Q)+P1+(P2*C)]}{Y} * 0.98\ [bar]$

(P+Q)= total load on the piston [kg]
C= travel+ extratravel [m]

2 STAGES MODEL	46/2	50/2 HOME	60/2 HOME	60/2	77/2	85/2	103/2	120/2	141/2	170/2	205/2
A	425	SEE SPECIFIC DRAWING 50/2	SEE SPECIFIC DRAWING 60/2	378	SEE SPECIFIC DRAWING 77/2	555	630	670	750	840	910
B	365			380		420	450	460	480	530	560
Ød	65			85		120	145	170	200	240	290
ØD	80			100		140	165	190	229	273	324
ØH	100			106		160	190	220	254	300	350
ØD1	35			48		70	85	97	120	146	180
ØD2	55			70		98	118	140	160	190	228
ØD3	-			-		-	-	-	-	-	-
F	110			120		145	160	175	205	230	255
ØH2	74			83		116	137	161	188	215	256
ØH3	-			-		-	-	-	-	-	-
ØHH	70			85		100	100	100	150	150	200
ØK	M16			M20		M30	M30	M30	M30	M30	M30
J	53			53		53	52	52	54	54	57
I	250			250		310	310	370	370	450	500
L	300			300		420	420	500	500	600	600
M	240			240		240	300	300	300	300	360
N	200			200		200	260	260	260	260	320
ØR	20			20		20	20	24	24	24	24
T	15			15		15	20	20	25	25	30
U	20			20		25	25	30	35	40	45
X	50			50		50	55	60	65	70	70
P1 [kg]	8	8	12	12	25	16	21	34	42	64	85
P2[kg/m]	5,3	6	10,2	9,2	16	18,7	18,2	21,8	32,5	28,7	36,4
Y	16,6	18,86	28,37	28,4	47,51	56,6	82,6	113,5	157,1	226,2	330,3
Pmax [bar]		**50**	**45**	**44**	**43**	**44**	**45**	**42**	**45**	**42**	**42**

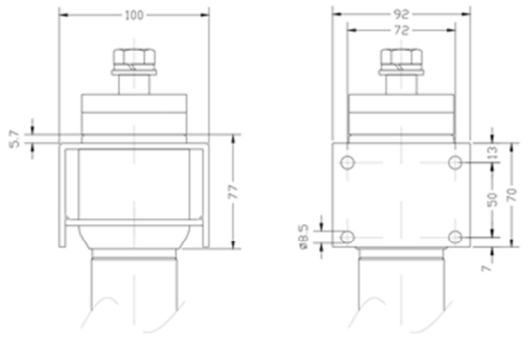
7.7 TELESCOPIC CYLINDER HOMELIFT 50/2 - 60/2

50/2 HOME



* Dimensioni di fissaggio sull'arcata
* Fixing dimensions on the car frame

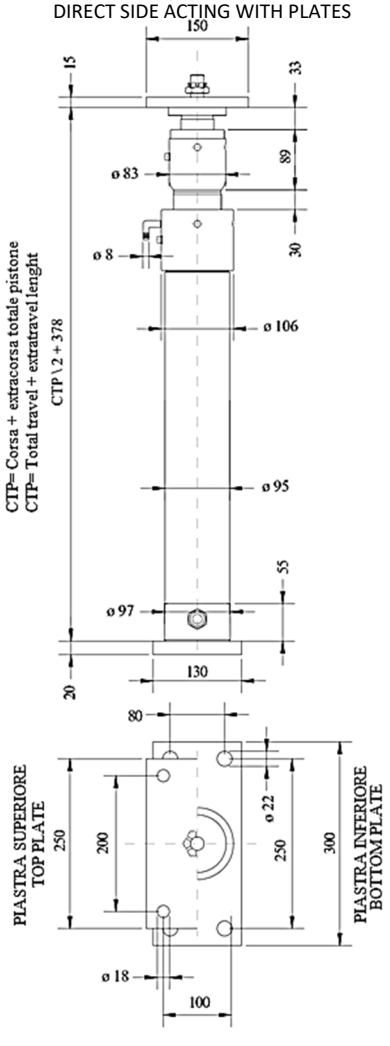
STAFFA DI FISSAGGIO BRACCI DI GUIDA 50/2 - G1
FIXING BRACKET FOR GUIDE ARMS 50/2 - G1



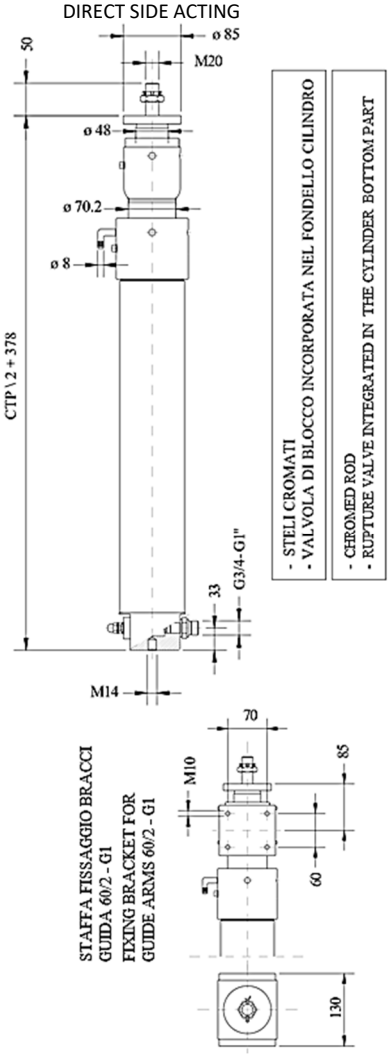
Caratteristiche particolari:
- STELI CROMATI
- VALVOLA DI BLOCCO INCORPORATA NEL FONDELLO CILINDRO

Specifications:
- CHROMED ROD
- RUPTURE VALVE INTEGRATED IN THE BOTTOM PART OF THE CYLINDER

DIRECT SIDE ACTING WITH PLATES

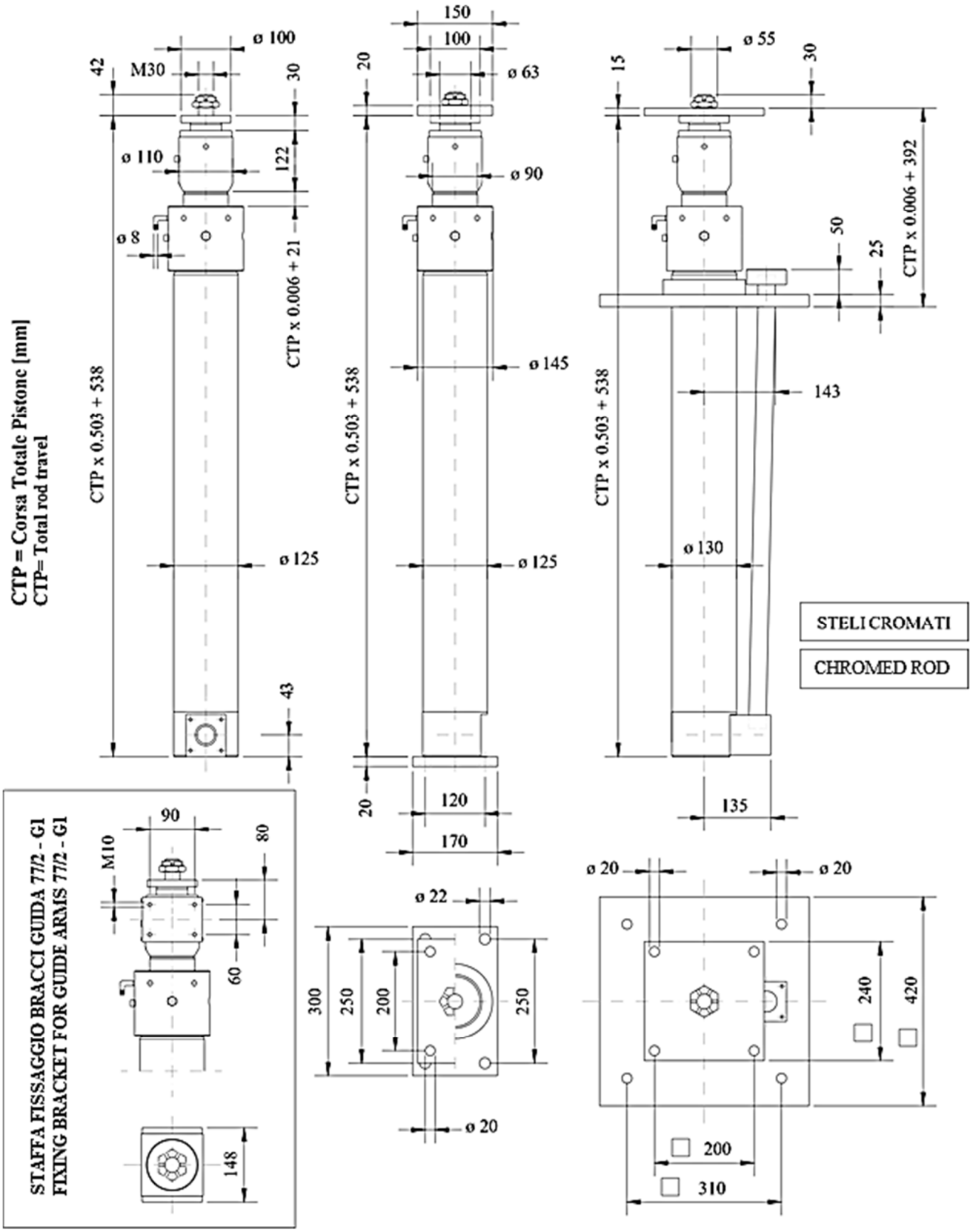


DIRECT SIDE ACTING



60/2 HOME

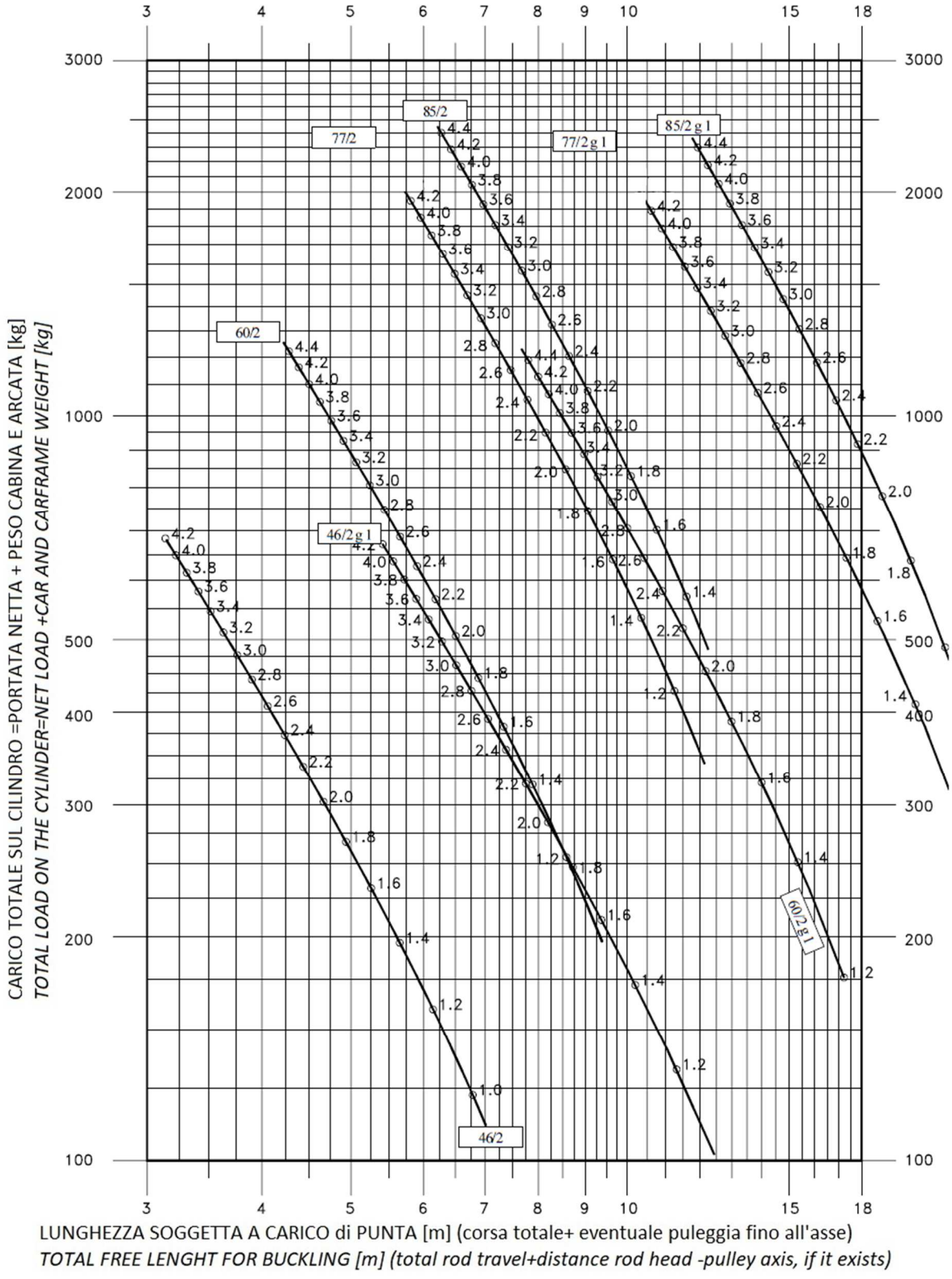
7.8 TELESCOPIC CYLINDER 77/2



7.9 CT-2: DIAGRAM OF THE BUCKLING STRENGTH ACCORDING TO STANDARD EN 81-20/50

SAFETY FACTOR ACCORDING TO EULERO ≥ 2,8

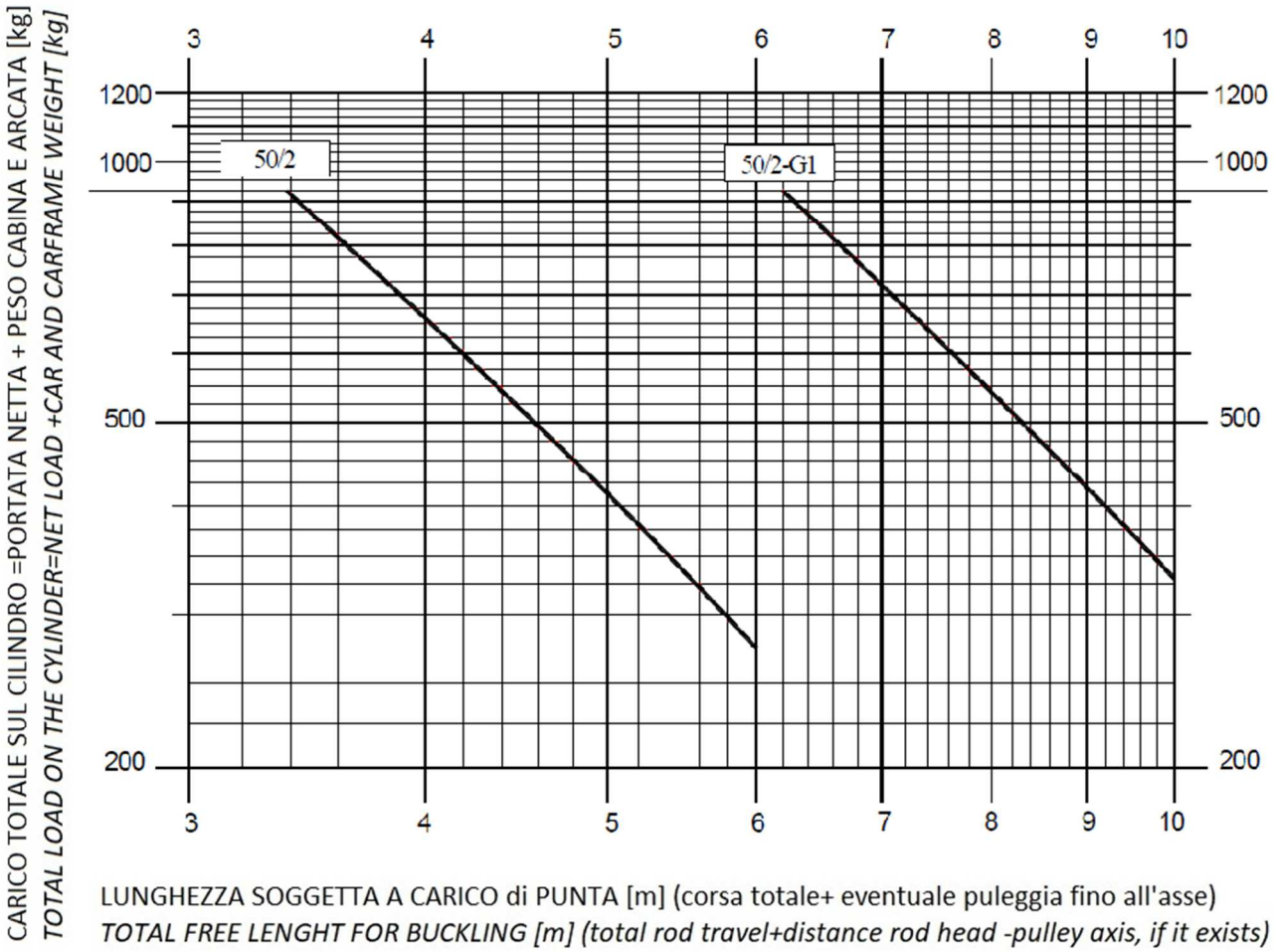
LEGENDA: 60/2g1 = telescopic cylinder 60, 2 stages, with 1 guide arm. Pressures indicated are in MPa=10bar



⚠ The graphics are indicative only: refer to the analytical calculation. For the max pressure for each configuration, refer to tables in paragraphs7.3 and 7.4

SAFETY FACTOR ACCORDING TO EULERO ≥ 2,8

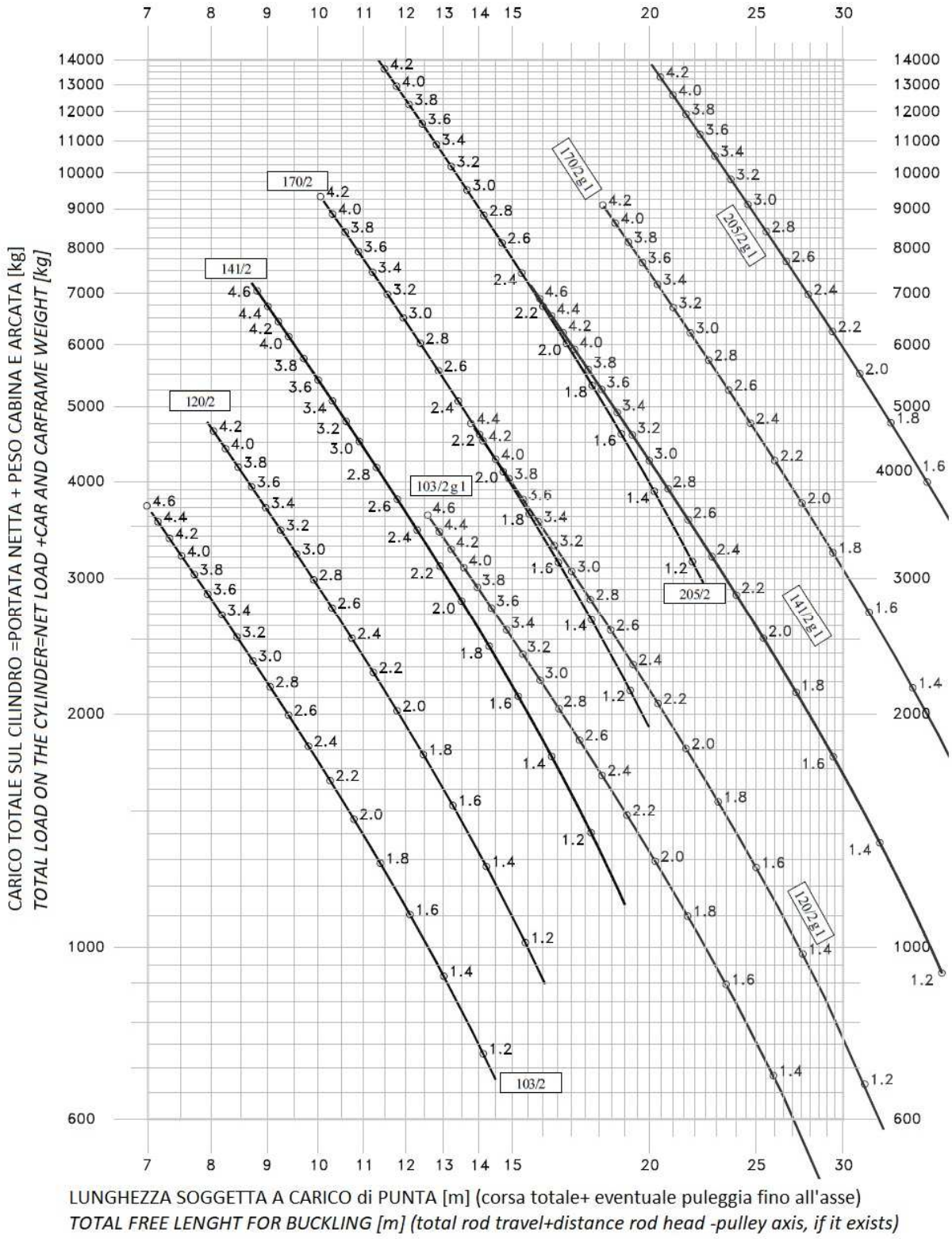
LEGENDA: 50/2g1 = telescopic cylinder 50, 2 stages, with 1 guide arm. Pressures indicated are in MPa=10bar



⚠ The graphics are indicative only: refer to the analytical calculation. For the max pressure for each configuration, refer to tables in paragraphs7.3 and 7.4

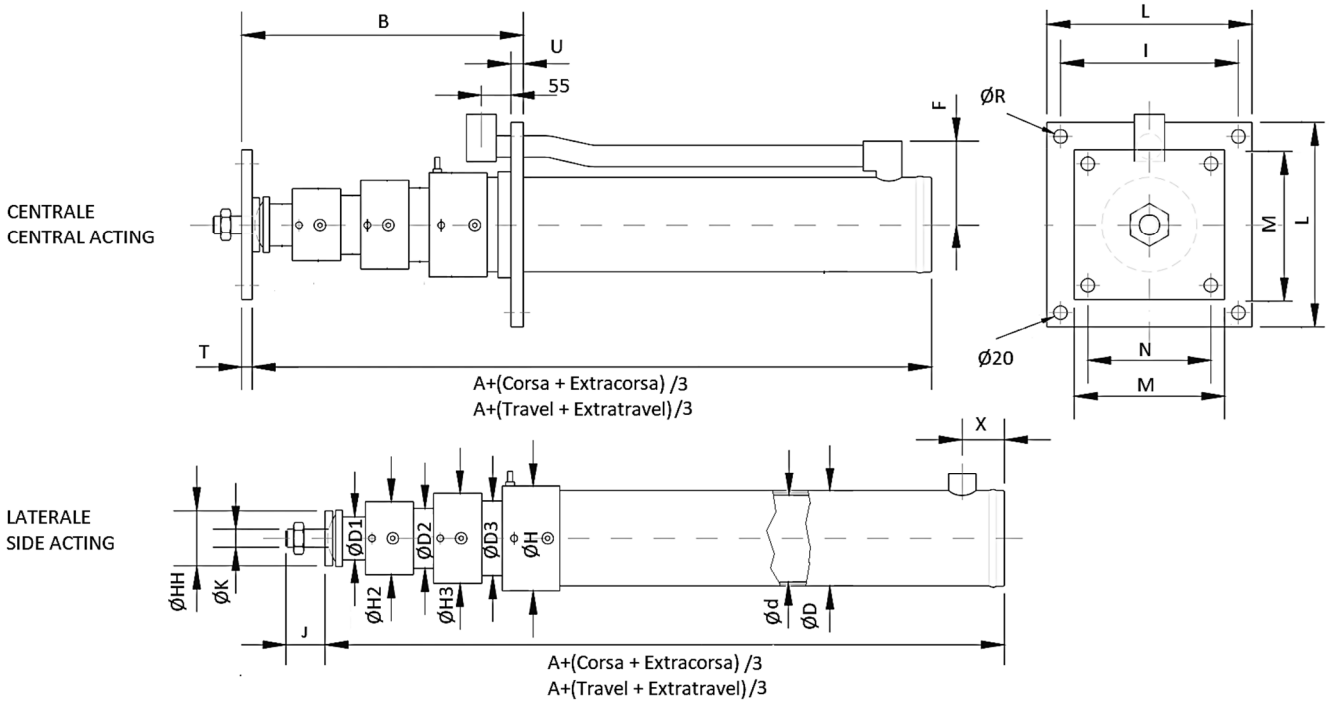
SAFETY FACTOR ACCORDING TO EULERO ≥ 2,8
Max. static pressure: 45 bar

LEGENDA: 170/2g1 = telescopic cylinder 170, 2 stages, with 1 guide arm. Pressures indicated are in MPa=10bar



⚠ The graphics are indicative only: refer to the analytical calculation. For the max pressure for each configuration, refer to tables in paragraphs7.3 and 7.4

7.10 TELESCOPIC CYLINDERS 3 STAGES



STATIC PRESSURE: $P_S = \frac{[(P+Q)+P1+(P2*C)]}{Y}$*0.98 [bar]

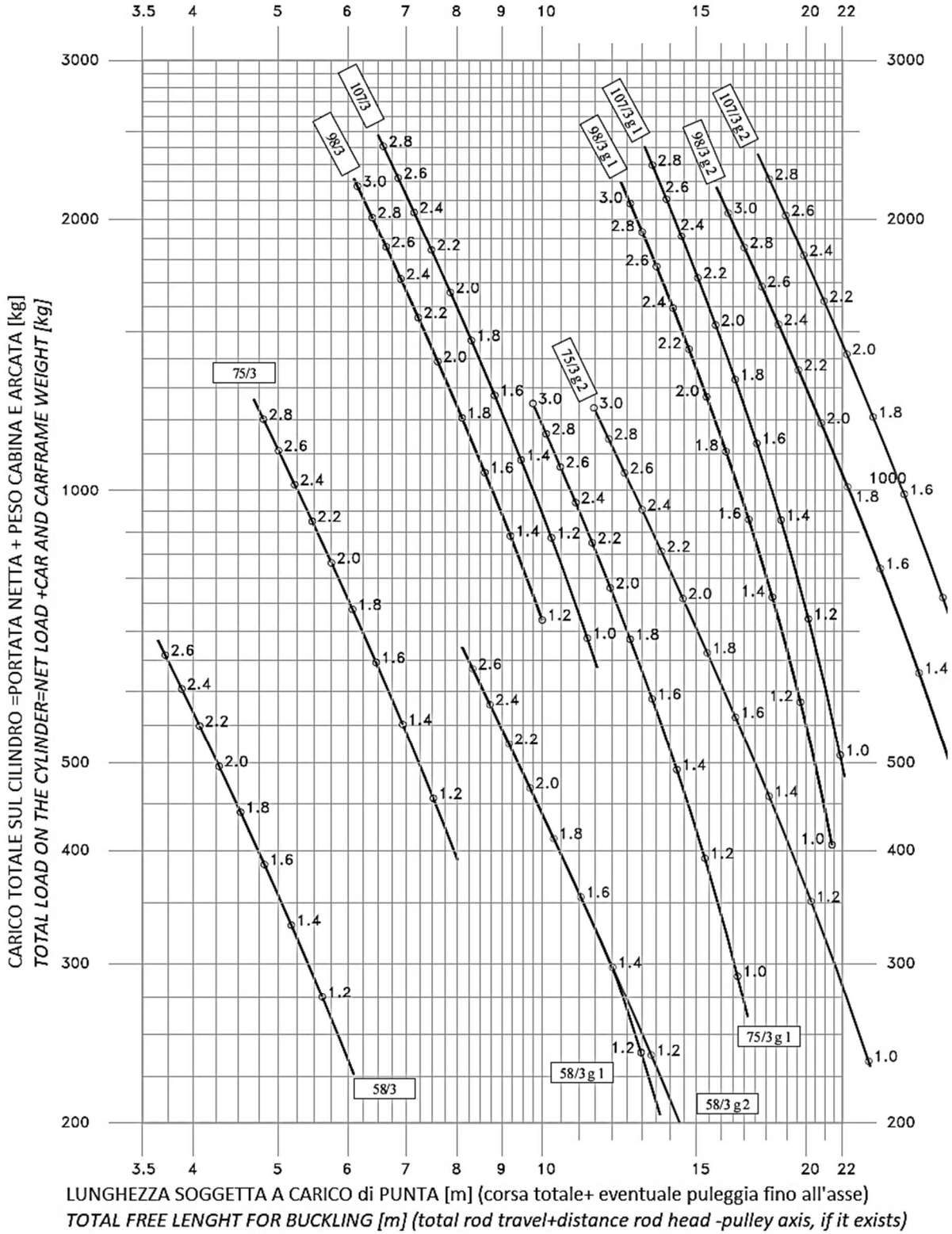
(P+Q)= total load on thel piston [kg]
C= travel + extratravel lenght [m]

3 STAGES MODEL	58/3	75/3	98/3	107/3	127/3	127/3 LV	150/3	150/3 LV	176/3	176/3 LV
A	680	735	835	855	955	975	1020	1040	1115	1135
B	520	550	585	585	660	680	680	700	715	735
Ød	100	130	170	185	220	220	260	260	305	305
ØD	120	150	190	210	245	245	298	298	343	343
ØH	135	170	215	240	280	280	325	325	380	380
ØD1	35	48	64.5	70	85	85	97	97	120	120
ØD2	55	70	89	98	118	118	140	140	160	160
ØD3	76	98.5	130	140	165	165	197	197	230	230
F	140	150	170	185	200	200	240	240	265	265
ØH2	74	89	106	116	137	137	161	161	188	188
ØH3	96	118	149	161	188	188	215	215	256	256
ØHH	70	85	100	100	100	100	100	100	150	120
ØK	M16	M20	M30	M30	M30	M30	M30	M30	M30	M30
J	53	53	42	53	52	52	54	54	54	54
I	250	310	310	370	370	370	450	450	500	500
L	300	420	420	500	500	500	600	600	600	600
M	240	240	240	240	300	300	300	300	300	300
N	200	200	200	200	260	260	260	260	260	260
ØR	20	20	20	24	24	24	24	24	24	24
T	15	15	20	20	20	20	25	25	25	25
U	20	25	25	30	35	35	40	40	45	45
X	55	55	55	60	65	65	70	70	75	75
P1 [kg]	16	20	29	33	46	46	69	69	90	90
P2[kg/m]	4,9	8,3	12,2	16,7	17,8	17,8	23,1	23,1	32,6	32,6
Y	26,2	44,2	75,7	89,6	126,7	126,7	177	177	243,5	243,5
Pmax [bar]	**27**	**30**	**32**	**29**	**30**	**45**	**29**	**42**	**32**	**44**

7.11 CT-3: DIAGRAM OF THE BUCKLING STRENGTH ACCORDING TO STANDARD EN81-20/50

SAFETY FACTOR ACCORDING TO EULERO ≥ 2,8

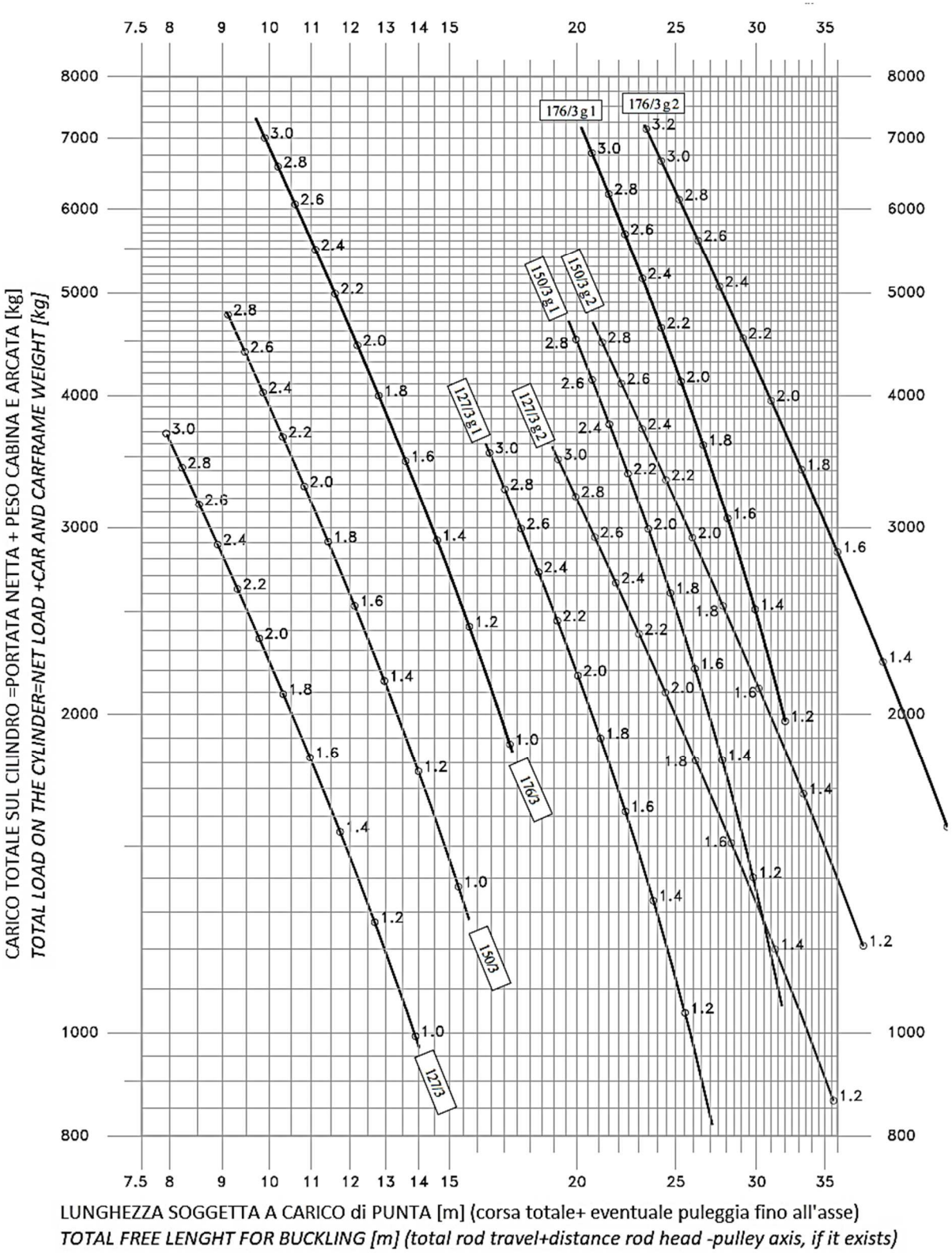
LEGENDA: 107/3g1 = telescopic cylinder 107, 3 stages, with 1 guide arm. Pressures indicated are in MPa=10bar



⚠ The graphics are indicative only: refer to the analytical calculation. For the max pressure for each configuration, refer to tables in paragraphs7.3 and 7.4

SAFETY FACTOR ACCORDING TO EULERO ≥ 2,8
Max. static pressure: 40 bar

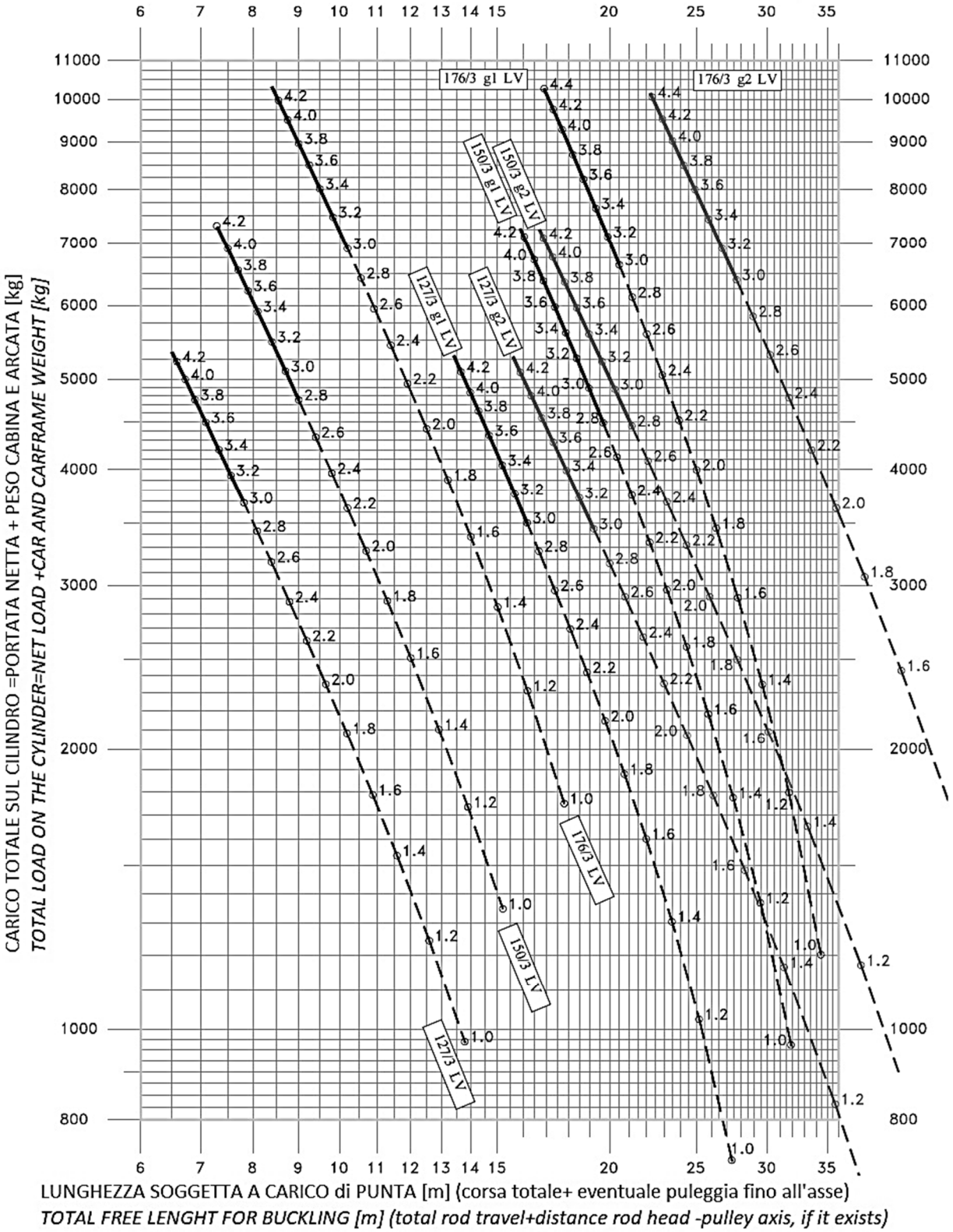
LEGENDA: 127/3g1 = telescopic cylinder 127, 3 stages, with 1 guide arm. Pressures indicated are in MPa=10bar



⚠ The graphics are indicative only: refer to the analytical calculation. For the max pressure for each configuration, refer to tables in paragraphs7.3 and 7.4

SAFETY FACTOR ACCORDING TO EULERO ≥ 2,8

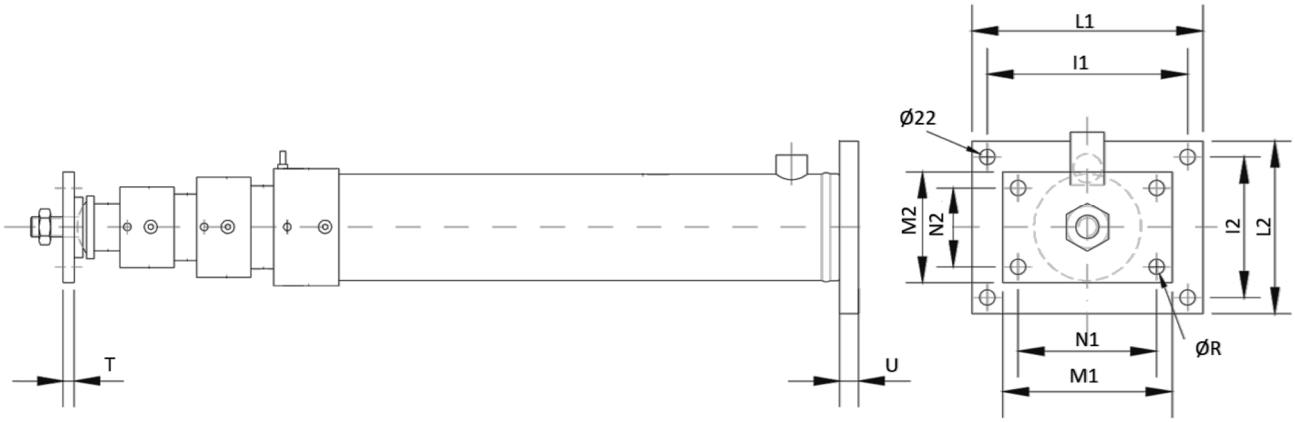
LEGENDA: 127/3g1 LV = telescopic cylinder 127 high press (LV), 3 stages, with 1 guide arm. Press in MPa=10bar. Hatched curves indicate the possibility to use the corresponding standard cylinder, not LV.



⚠ The graphics are indicative only: refer to the analytical calculation. For the max pressure for each configuration, refer to tables in paragraphs7.3 and 7.4

7.12 BOTTOM AND UPPER PLATES

2 and 3 stages cylinders direct side acting can be supplied with upper and lower plates as optional



2 STAGES

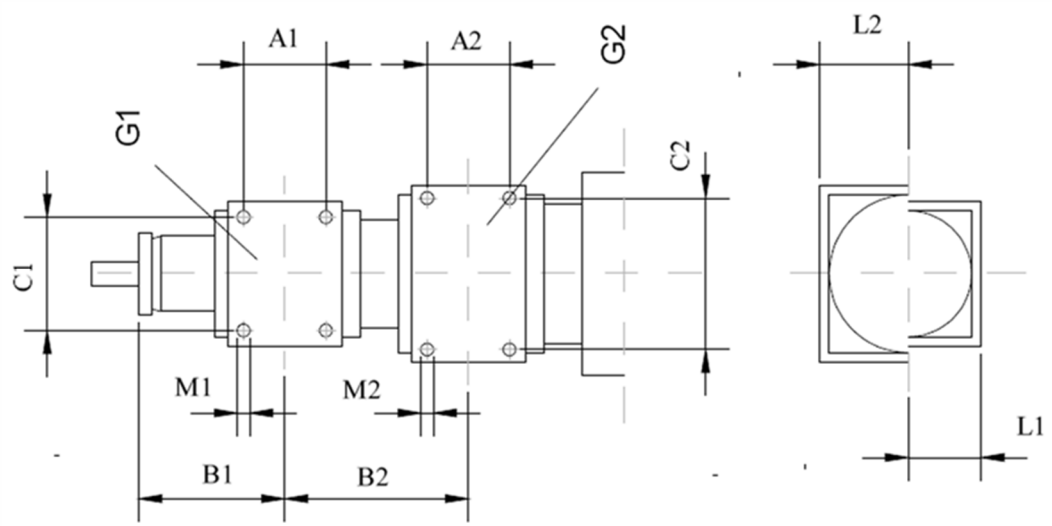
2 STAGES MODEL	46/2	50/2 HOME	60/2 HOME	60/2	77/2	85/2	103/2	120/2	141/2	170/2	205/2
I1	250	SEE SPECIFIC DRAWING 50/2	SEE SPECIFIC DRAWING 60/2	250	SEE SPECIFIC DRAWING 77/2	250	350	350	350	400	480
I2	70			80		120	160	160	200	270	310
L1	300			300		300	400	400	400	450	530
L2	120			130		170	210	210	250	320	360
M1	250			250		250	250	250	300	300	400
M2	150			150		150	150	150	200	200	300
N1	200			200		200	200	200	250	250	350
N2	100			100		100	100	100	150	150	250
ØR	18			18		20	20	20	22	22	24
T	15			15		20	20	20	25	25	30
U	20			20		20	25	25	25	25	30

3 STAGES

3 STAGES MODEL	58/3	75/3	98/3	107/3	127/3	127/3 LV	150/3	150/3 LV	176/3	176/3 LV
I1	250	250	350	350	400	400	400	400	500	500
I2	100	120	160	200	230	230	270	270	330	330
L1	300	300	400	400	450	450	450	450	550	550
L2	150	170	210	250	280	280	320	320	380	380
M1	250	250	250	250	250	250	250	250	300	300
M2	150	150	150	150	150	150	150	150	200	200
N1	200	200	200	200	200	200	200	200	250	250
N2	100	100	100	100	100	100	100	100	150	150
ØR	18	18	20	20	20	20	20	20	22	22
T	15	15	20	20	20	20	20	20	25	25
U	20	20	25	25	25	25	25	25	30	30

7.13 GUIDE ARMS

In order to achieve greater loading level on the piston, jointly with high rod length, for each extension it is possible to add a couple of guide arms, so that the buckling resistance is increased. On the diagrams the related curves are indicated with “g” letter, followed by the number of guide arms provided (g1, g2)



2 STAGES

2 STAGES MODEL	46/2	50/2 HOME	60/2 HOME	60/2	77/2	85/2	103/2	120/2	141/2	170/2	205/2
A1	60	SEE SPECIFIC DRAWING 50/2	SEE SPECIFIC DRAWING 60/2	60	SEE SPECIFIC DRAWING 77/2	60	60	60	80	80	80
B1	95			95		102	120	118	125	134	135
C1	60			70		90	110	130	150	180	200
M1	M10			M10		M10	M10	M12	M16	M16	M16
L1	57			65		74	89	101	117	131	151

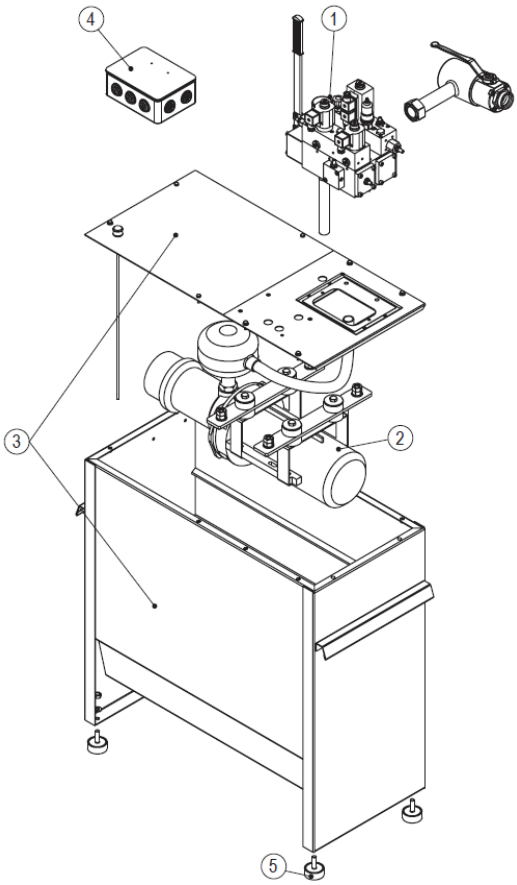
3 STAGES

3 STAGES MODEL	58/3	75/3	98/3	107/3	127/3	127/3 LV	150/3	150/3 LV	176/3	176/3 LV
A1	60	60	60	60	60	60	60	60	80	80
B1	85	85	87	90	115	115	120	120	136	136
C1	60	70	90	100	110	110	130	130	150	150
M1	M10	M10	M10	M10	M10	M10	M12	M12	M16	M16
L1	57	65	74	78	89	89	101	101	117	117
A2	60	60	60	60	80	80	80	80	80	80
B2	145	145	153	153	165	165	167	167	155	155
C2	80	100	120	130	150	150	180	180	200	200
M2	M10	M10	M12	M12	M16	M16	M16	M16	M16	M16
L2	68	79	95	101	117	117	131	131	151	151

8 SPARE PARTS

This chapter contains useful information for the installation, managing and maintenance of your OMARLIFT hydraulic project. It's a schematic chapter, full of tables, mended to facilitate the search of the needed component. At the moment it contains information regarding the standard parts, and it will be enlarged and better detailed in the future revisions. We invite you to send us every suggestion on this topic, it will be helpful to improve the service provided, and for every specific detail, request of special parts or whatever clarification our Sales Department will be at your disposal.

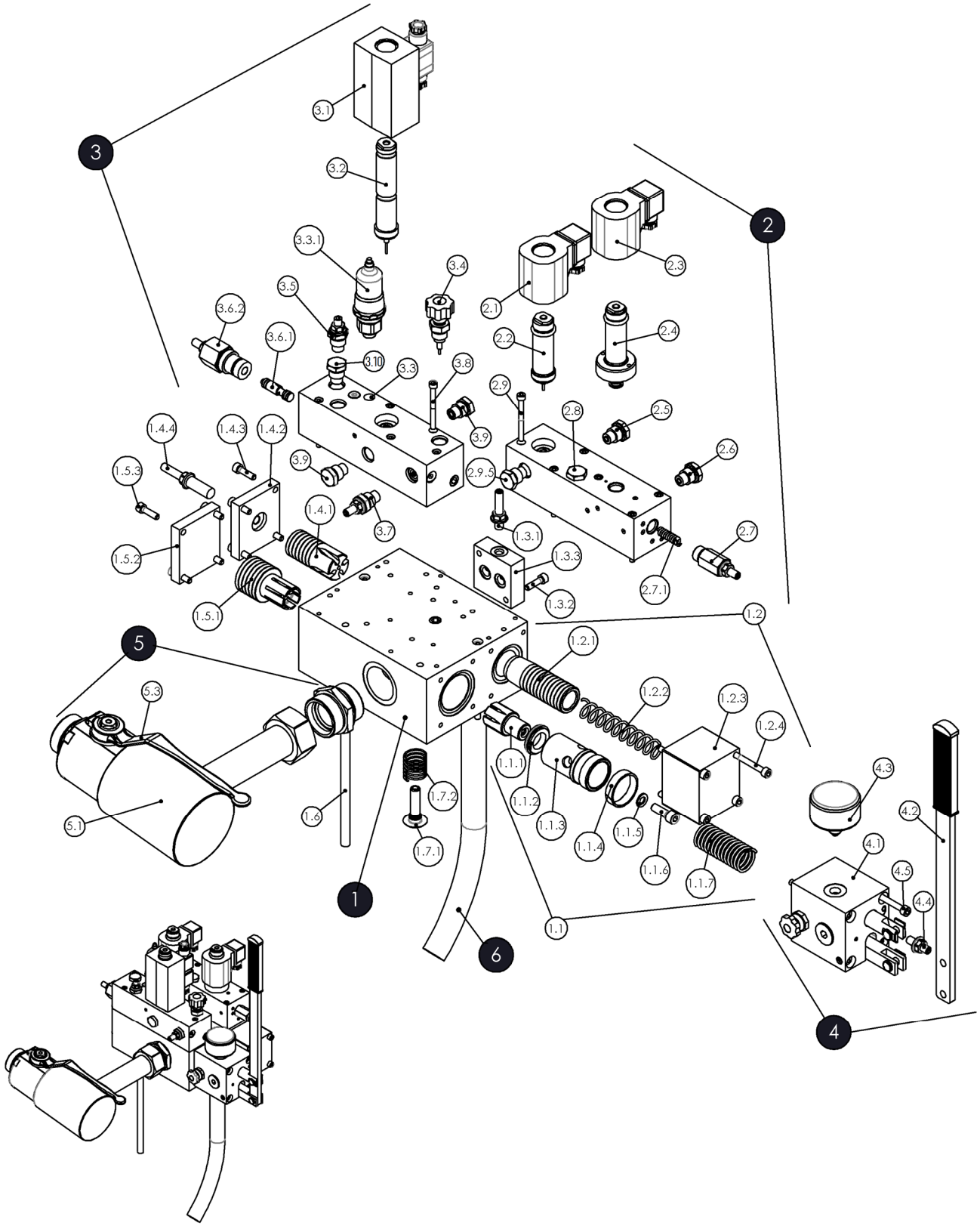
8.1 PUMP UNIT



LEGENDA

N°	DESCRIPTION
1	NL VALVE & Accessories
2	MOTOR – PUMP GROUP& Accessories
3	TANK & Accessories
4	ELECTRICAL CONNECTION BOX & Accessories
5	ANTIVIBRATION PADS & Other accessories for the pump unit

8.2 NL VALVE GROUP



N.	DESCRIPTION	N.	DESCRIPTION
1	VALVE BODY	2.4	Mechanical part for EVS (upon request)
1.1	VBP assembly	2.5	Screw n° 5
1.1.1	VBP piston	2.6	Screw n° 7
1.1.2	Main VBP seal	2.7	Screw n° 1
1.1.3	VBP piston	2.7.1	Screw for screw n° 1
1.1.4	Guide ring	2.8	Screw n° 10 housing
1.1.5	Rove	2.9	Fixing screw (x 6) M5 x 55
1.1.6	Fixing screw (x 1) M8 x 25	2.9.5	Strangler not adjustable
1.1.7	Spring for VBP	**3**	DESCENT PILOT
1.2	Silence kit	3.1	Double coil for EVD
1.2.1	VM conic piston	3.2	Double mechanical part of EVD
1.2.2	Spring for VM	3.3	Housing for pressure switches
1.2.3	Cap	3.3.1	Pressure switch
1.2.4	Fixing screw (x 4) M6 x 65	3.4	Emergency button
1.3.1	Screw n° 2	3.5	Screw n° 4
1.3.2	Fixing screw (x 2) M6 x 22	3.6.1	VRA piston
1.3.3	Cover	3.6.2	Screw n° 8
1.4.1	VRF piston	3.7	Screw n° 3
1.4.2	Cover	3.8	Fixing screw (x 6) M55 x 55
1.4.3	Fixing screw (x 4) M6 x 22	3.9	Strangler not adjustable
		3.10	Screw n°15 (Opt.)/ Strangler not adjust.
1.4.4	Screw n° 6	**4**	HAND PUMP ASSEMBLY
1.5.1	VBS piston	4.1	Hand pump body
1.5.2	Cover	4.2	Lever
1.5.3	Fixing screw (x 4) M6 x 22	4.3	Manometer
1.6	PVC pipe (x 2)	4.4	Screw n° 9
1.7.1	VR piston	4.5	Fixing screw (x 4) M6 x 80
1.7.2	Spring for VR	**5**	SHUT – OFF FILTER VALVE
2	ASCENT PILOT	5.1	Shut – off filter valve body
2.1	Coil for EVR	5.2	Fitting
2.2	Mechanical part for EVR	5.3	Filter lever
2.3	Coil for EVS (upon request)	**6**	OIL OUTLET PIPE

NL CONFIGURATION TABLE

NL VALVE BLOCK CONFIGURATION							
Valve type	NL210				NL380		NL600	STANDARD DEVICES
Hose connection	3/4"	1" 1/4		1" 1/2	1" 1/2	2"	2"	
Tank type	110/S	110/S 135/S 210/S	320/S	210/S 320/S 450	320/S 450	450	680	
Delivery range l/min	25 35	55 - 75 100 125 - 150	100 125 150	180 210	250 300	380	500 600	
Motor starting	DIRECT							
Coils Voltage Volt	12 - 24 - 48 - 60 - 110 - 180 - 220 (/12 Volt Emergency upon request)							
Shut – off valve	FR034	FR114		FR112		FR200		
Packing type	● Standard							
● Hand pump								OPTIONAL ACCESSORIES
● λ-Δ Starting								
● Soft – Starter Starting								
● Valve Heating Resistance								
● Minimum pressure switch								
● Maximum pressure switch								
● Overload pressure switch ● NO ● NC								
● Soft Stop device								
● Screw nr.15 adjusting downward start								
Packing type ● Wooden box								

ASCENT PILOT BLOCK CONFIGURATION TABLE

ASCENT PILOT BLOCK CONFIGURATION				
Valve type	NL210	NL380	NL600	STANDARD DEVICES
Delivery Range l/min	55-75-100-125-150–180-210	250 - 300 - 380	500 - 600	
Starting	DIRECT			
Coils Voltage Volt	12 - 24 - 48 - 60 - 110 - 180 - 220			
● EVS coil for λ-Δ Starting				OPTIONAL ACCESSORIES
● Screw n° 10 kit for Soft - Starter Starting				

DESCENT PILOT BLOCK CONFIGURATION TABLE

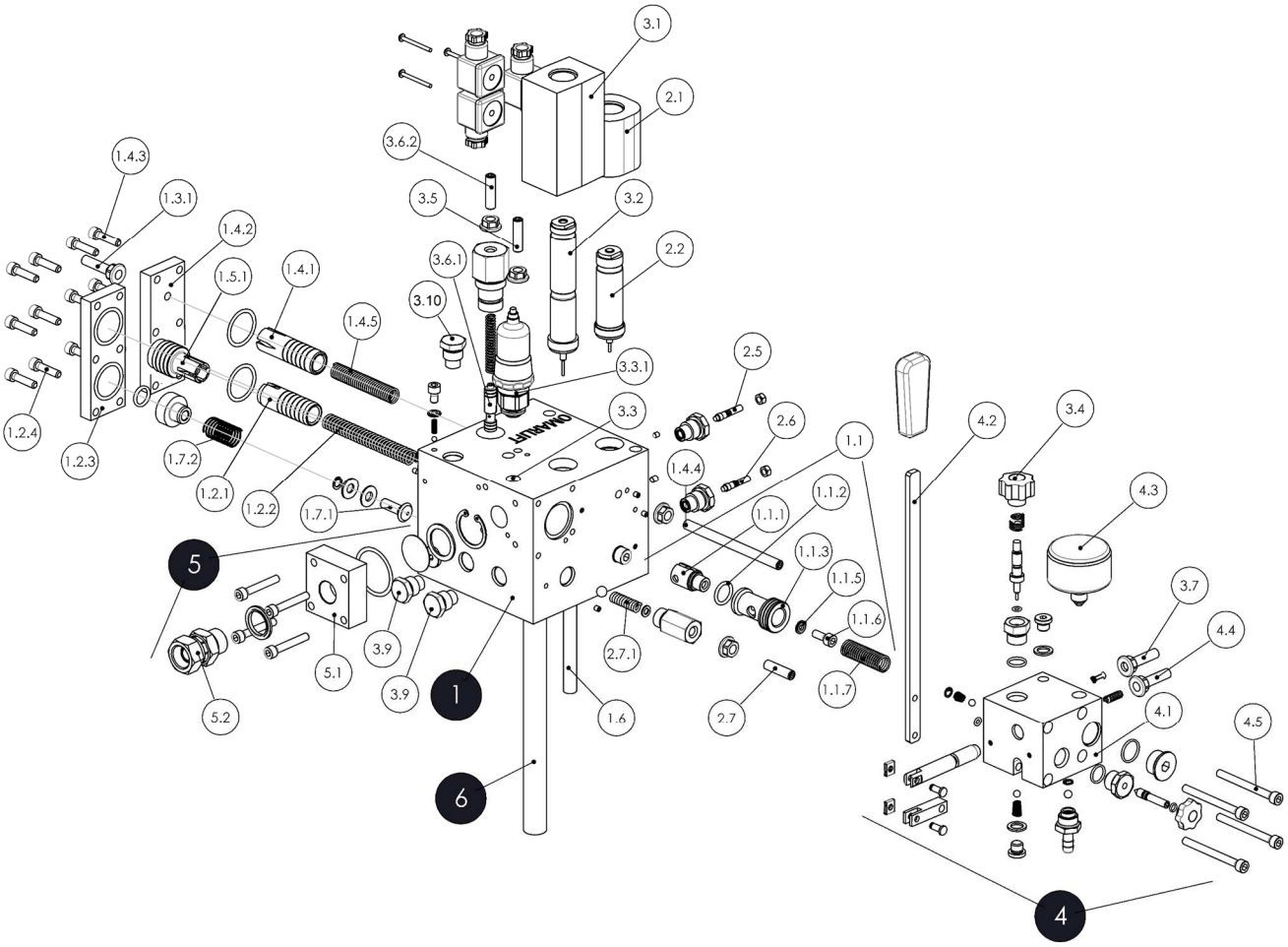
DESCENT PILOT BLOCK CONFIGURATION				
Valve type	NL210	NL380	NL600	STANDARD DEVICES
Delivery Range l/min	55-75-100-125-150-180-210	250 - 300 - 380	500 - 600	
Coils Voltage Volt	12 - 24 - 48 - 60 - 110 - 180 - 220			

PRESSURE SWITCHES	OVERLOAD	
	Normally Open	Normally Closed
	Code	Code
	CA100000	CA100073
	MAX PRESSURE SWITCH	MIN PRESSURE SWITCH
	Code	Code
	CA100354	CA101683
	Three – way fitting for more than two pressure switches	
	Code	
	8H3F0002	

HAND PUMP	NEW SINCE 2006		OLD FROM 1977 TO 1993	
Description	TYPE PM - 6	TYPE PM – 6A	TYPE PM - 10	TYPE PM – 10A
Lever	8H202572	8H202572	8H201518	8H201518
Body	8H202570	8H202650	8H201516	8H201787
Manometer	CA100132	CA100132	CA100220	CA100220
Complete	8H300631	8H300637	8H300277	8H300240

NL VALVE SALES	VBP	COMPLETE KIT
NL TYPE	CODE	CODE
NL210	8H200941	8H3F0148
NL380	8H200942	8H3F0149
NL600	8H200943	8H3F0150

8.3 HC VALVE GROUP



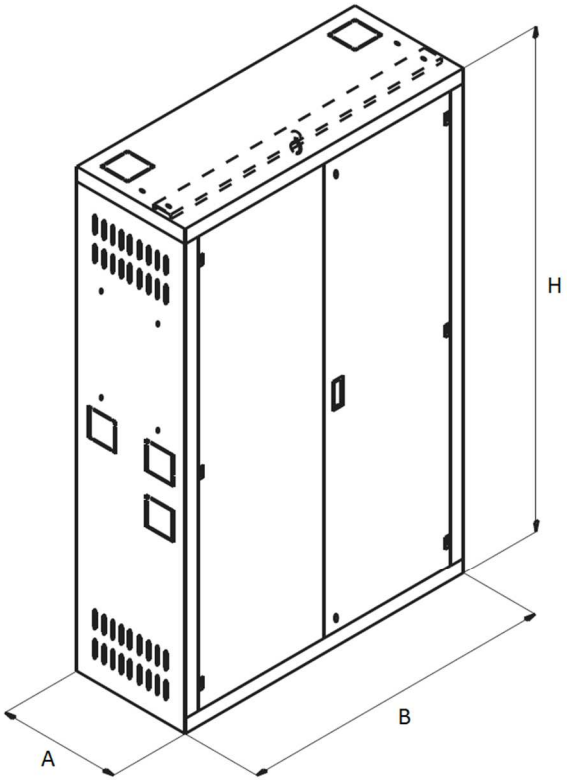
N.	DESCRIPTION	N.	DESCRIPTION
1	VALVE BODY	2.5	Screw n° 5
1.1	VBP assembly	2.6	Screw n° 7
1.1.1	VBP piston	2.7	Screw n° 1
1.1.2	Main VBP seal	2.7.1	Screw for screw n° 1
1.1.3	VBP piston	3.1	Double coil for EVD
1.1.5	Rove	3.2	Double mechanical part for EVD
1.1.6	Fixing screw (x 1) M6 x 16	3.3	Housing for pressure switches
1.1.7	Spring for VBP	3.3.1	Pressure switches
1.2.1	VM piston	3.4	Emergency button
1.2.2	Spring for VM	3.5	Screw n° 4
1.2.3	Cap	3.6.1	VRA piston
1.2.4	Fixing screw (x 4) M6 x 65	3.6.2	Screw n° 8
1.3.1	Screw n° 2	3.7	Screw n° 3
1.4.1	VRF piston	3.9	Strangler not adjustable/ Screw nr.15
		3.10	Screw n°15 (Opt.)/ Strangler not adjust.
1.4.2	Cover	**4**	HAND PUMP ASSEMBLY
1.4.3	Fixing screw (x 4) M6 x 25	4.1	Hand pump body
1.4.4	Screw n° 6	4.2	Lever
1.4.5	Spring for VRF	4.3	Manometer
1.5.1	VBS piston	4.4	Screw n° 9
1.6	PVC pipe (x 2)	4.5	Fixing screw (x 4) M6 x 65
1.7.1	VR piston	**5**	SHUT – OFF FILTER VALVE
1.7.2	Spring for VR	5.1	Shut – off filter valve body
2.1	Coil for EVR	5.2	Fitting
2.2	Mechanical part for EVR	**6**	OIL OUTLET PIPE

8.4 TANK ACCESSORIES

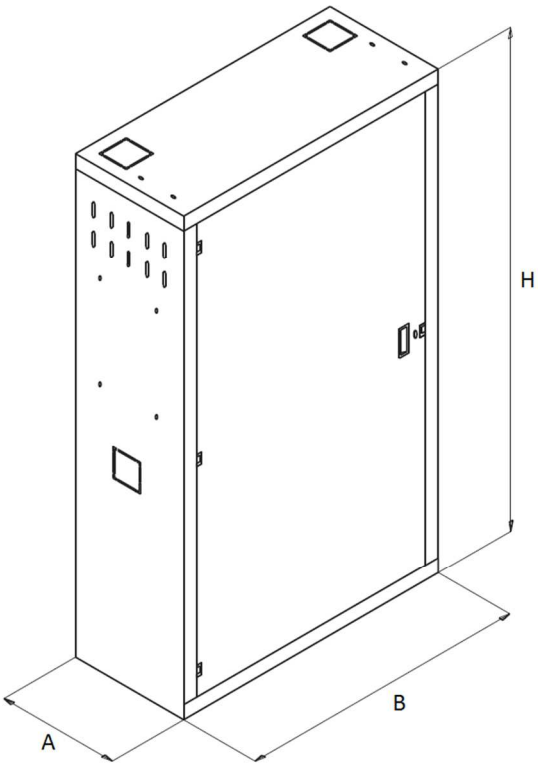
PUMP UNIT ACCESSORIES TABLE

PUMP UNIT TANK ACCESSORIES	DESCRIPTION		CODE
ANTIVIBRATION BEARINGS	All tanks		8H300528
Hand pump to assemble on the NL (PM - 6)			8H300277
Hand pump to assemble on the tank (PM - 6A)			8H300240
EVS electrovalve for Star/delta starting			8H3F0073
Kit adjustable delay by screw n° 10 for Soft - Starter			8H3F0159
Overload pressure switch Normally Open			CA100000
Overload pressure switch Normally Closed			CA100073
Max. pressure switch Protection IP54 with connecting cable and plug			CA100354
Min. pressure switch Protection IP54 with connecting cable and plug			CA101683
Valve heating resistor 60 W	230 V 400 V		CA100419 CA102451
OIL HEATING RESISTOR 500 W	230 V	All tanks	CA102507
	400 V	All tanks	CA102508
MICROLEVELLING	20 l/min - 2,9 kW		8H300147
Oil cooling system by air complete with 2 connecting pipes (3 m cad.), fittings and all accessories	6 kW (5160 kcal/h) 230/400 V (+/- 10%) 3x50/60 Hz		8H300537
	10,5 kW (9000 kcal/h) 230/400 V (+/- 10%) 3x50/60 Hz		8H300644
	16,4 kW (18000 kcal/h) 230/400 V (+/- 10%) 3x50/60 Hz		8H300646
Oil cooling system by water complete with 2 connecting pipes (3 m cad.), fittings and all accessories	10,5 kW (9000 kcal/h) 230/400 V (+/- 10%) 3x50/60 Hz		8H300164
	21 kW (18000 kcal/h) 230/400 V (+/- 10%) 3x50/60 Hz		8H300165
Electrical wiring of the oil cooling system			8H300282

8.5 MRL CABINETS



Armadi MRL MEDIUM - LARGE - X-LARGE
MRL cabinets MEDIUM - LARGE - X-LARGE



Armadio MRL mini
Mini MRL cabinet

MRL CABINETS FOR PUMP UNITS						
	TANK	A	B	H	CODE	REMARKS
MINI 1	C40-C50 40-50/S-60/S-90/S	410	730	1550	8H203099	NO HDU
MINI 1	60/S	410	730	1550	8H203099	HDU
MINI 2	C40-C50 40-50/S-90/S	520	800	1550	8H202437	HDU
MEDIUM	110/S – 135/S	400	900	2100	8H202430	
LARGE	210/S 320/S	580	1120	2100	8H202431	
X - LARGE	450 – 680	1250	1900	2200	8H202438	

For more technical information, refer to chapters 4.9 and 6.16.

⚠ ATTENTION: NEVER OVERLOAD IN RESPECT TO THE VALUES INDICATED ON THE TABLE.

8.6 CYLINDERS

8.6.1 STANDARD CYLINDERS

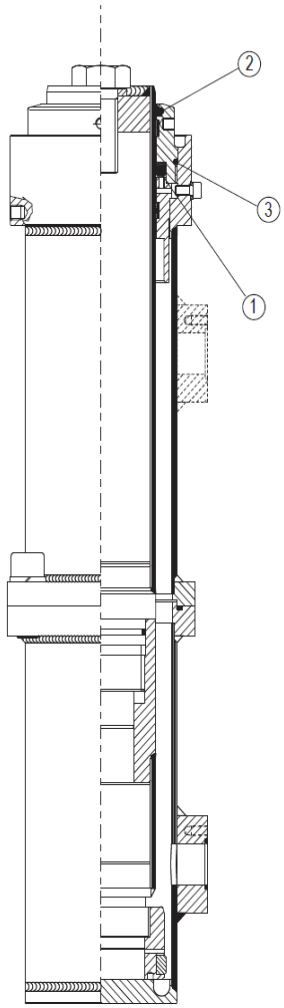


TABLE OF PISTON MODELS CHRONICLE

PRODUCTION STARTING DATES				
ROD	C97 ACTUAL	T91	CF2	CF1
Ø 50	21 Nov 1997	-	-	-
Ø 60	21 Nov 1997	Apr 1992	-	1977 / 1985 – 1986
Ø 70	01 Oct 1997	Jul 1991	1986 / 1991	1977 / 1985 – 1986
Ø 80	21 Nov 1997	Oct 1991	1986 / 1991	1977 / 1985 – 1986
Ø 85	Oct 2005	-	1986 / 1991	-
Ø 90	21 Nov 1997	1992	1986 / 1991	1977 / 1985 – 1986
Ø 100	01 Oct 1997	Sep 1991	1986 / 1991	1977 / 1985 – 1986
Ø 110	03 Nov 1997	Sep 1992	1986 / 1991	1977 / 1985 – 1986
Ø 120	10 Nov 1997	Mar 1992	1986 / 1991	1977 / 1985 – 1986
Ø 130	10 Nov 1997	Mar 1992	1986 / 1991	1977 / 1985 – 1986
Ø 150	10 Nov 1997	Sep 1992	1986 / 1991	1977 / 1985 – 1986
Ø 180	Mar 1998	Sep 1992	1986 / 1991	1977 / 1985 – 1986
Ø 200	Mar 1998	Sep 1992	1986 / 1991	-
Ø 230	Mar 1998	Sep 1992	-	-

SEALS KIT				
CYLINDER				
HC	C97	CS	Ø ROD	KIT CODE
x			50	8H3F0656
x			60	8H3F0657
x			70	8H3F0658
	x	x	80	8H3F0083
	x		85	8H3F0078
	x	x	90	8H3F0084
	x	x	100	8H3F0085
	x	x	110	8H3F0086
	x		120	8H3F0087
	x		130	8H3F0088
	x		150	8H3F0089
	x		180	8H3F0090
	x		200	8H3F0091
	x		230	8H3F0092

SEALS LEGENDA			
N	DESCRIPTION	QTY	
1	SEAL	1	SEALS KIT
2	SCRAPER	1	
3	OR	1	

COMPARISON BETWEEN DIFFERENT TYPES OF CYLINDERS SEALS KIT

SEAL								SCRAPER							RING GUIDE						
Ø ROD	C97 CS	T91	CF2	CF1	HC2	HC	QTY	C97 CS	T91	CF2	CF1	HC2	HC	QTY	C97 CS	T91	CF2	CF1	HC2	HC	QTY
50	**B/NEI 255196**	**B/NEI 255196**	-	-	**B/NEI 255196**	-	1	PW 50	PW 50	-	-	PW 50	-	1	I/DWR 50	I/DWR 50	-	-	I/DWR 50	-	2
60	**B/NEI 295236**	**B/NEI 295236**	-	**B/NEI 295236**	**B/NEI 295236**	**B/NEI 295236**	1	PW 60	PW 60	-	PW 60	PW 60	PW 60	1	I/DWR 60	I/DWR 60	-	I/DWR 60	I/DWR 60	I/DWR 60	2
70	**B/NEI 334275/1**	**B/NEI 334275/1**	**B/NEI 334275/1**	**B/NEI 334275/1**	**B/NEI 334275/1**	**B/NEI 334275/1**	1	PW 70	PW 70	PW 70	PW 70	PW 70	PW 70	1	I/DWR 70	I/DWR 70	I/DWR 70	I/DWR 70	I/DWR 70	I/DWR 70	2
80	**B/NEI 393314/1**	**B/NEI 393314/1**	**B/NEI 393314/1**	**B/NEI 393314/1**	-	-	1	PW 80	PW 80	PW 80	PW 80	-	-	1	I/DWR 80	I/DWR 80	I/DWR 80	I/DWR 80	-	-	2
85	B/NEI 393334/1	-	B/NEI 413334	-	-	-	1	PW 85/1	-	PW 85/1	-	-	-	1	I/DWR 85	-	I/DWR 85	-	-	-	2
90	**B/NEI 433354**	**B/NEI 433354**	**B/NEI 433354**	**B/NEI 433354**	-	-	1	PW 90	PW 90	PW 90	PW 90	-	-	1	I/DWR 90	I/DWR 90	I/DWR 90	I/DWR 90	-	-	2
100	**B/NEI 472393/1**	**B/NEI 472393/1**	**B/NEI 472393/1**	**B/NEI 472393**	-	-	1	PW 100	PW 100	PW 100	PW 100	-	-	1	I/DWR 100	I/DWR 100	I/DWR 100	I/DWR 100	-	-	2
110	**B/NEI 511433**	**B/NEI 511433**	**B/NEI 511433**	**B/NEI 511433**	-	-	1	PW 110	PW 110	PW 110	PW 110	-	-	1	I/DWR 110	I/DWR 110	I/DWR 110	I/DWR 110	-	-	2
120	**B/NEI 551472**	**B/NEI 551472**	**B/NEI 570472**	**B/NEI 570472**	-	-	1	PW 120	PW 120	PW 120	-	-	-	1	I/DWR 120	I/DWR 120	I/DWR 120	I/DWR 120	-	-	2
130	**B/NEI 590511**	**B/NEI 590511**	**B/NEI 610511**	**B/NEI 610511**	-	-	1	PW 130	PW 130	PW 130	PW 130	-	-	1	I/DWR 130	I/DWR 130	I/DWR 130	I/DWR 130	-	-	2
150	**B/NEI 669590/1**	**B/NEI 669590/1**	**B/NEI 669590/1**	**B/NEI 669590/1**	-	-	1	PW 150	PW 150	PW 150	PW 150	-	-	1	I/DWR 150	I/DWR 150	I/DWR 150	I/DWR 150	-	-	2
180	**B/NEI 787708**	**B/NEI 787708**	**B/NEI 767708**	**B/NEI 767708**	-	-	1	PW 180	PW 180	PW 180	PW 180	-	-	1	I/DWR 180	I/DWR 180	I/DWR 180	I/DWR 180	-	-	2 (C97 3)
200	**B/NEI 866787**	**B/NEI 866787**	**B/NEI 866787**	-	-	-	1	PW 200	PW 200	PW 200	-	-	-	1	I/DWR 200	I/DWR 200	I/DWR 200	-	-	-	3 (CF2 2)
230	**B/NEI 1023905**	**B/NEI 1023905**	-	-	-	-	1	PW 230	PW 230	-	-	-	-	1	I/DWR 230	I/DWR 230	-	-	-	-	3

OR								OR						
Ø ROD	C97/CS	T91	CF2	CF1	HC2	HC	QTY	C97CS	T91	CF2	CF1	HC2	HC	QTY
50	**78,97 x 3,53**	82,14 x 3,53	-	-	88,49 X 3,53	-	1	-	75,79 x 3,53	-	-	-	-	1
60	**88,49 x 3,53**	82,14 x 3,53	-	94,84 x 3,53	88,49 X 3,53	74,61 X 3,53	1	-	75,79 x 3,53	-	-	-	-	1
70	**98,02 x 3,53**	91,67 x 3,53	101,20 x 3,53	110,72 x 3,53	88,49 X 3,53	88,49 X 3,53	1	-	85,32 x 3,53	-	-	-	-	1
80	**113,90 x 3,53**	107,54 x 3,53	101,20 x 3,53	110,72 x 3,53			1	-	98,02 x 3,53	-	-	-	-	1
85	**113,90 x 3,53**	-	120,24 x 3,53	-			1	-	-	-	-	-	-	1
90	**123,40 x 3,53**	117,07 x 3,53	120,24 x 3,53	**123,40 x 3,53**			1	-	110,72 x 3,53	-	-	-	-	1
100	**132,90 x 3,53**	126,59 x 3,53	123,40 x 3,53	**132,90 x 3,53**			1	-	120,24 x 3,53	-	-	-	-	1
110	**142,50 x 3,53**	139,29 x 3,53	136,12 x 3,53	139,29 x 3,53			1	-	129,77 x 3,53	-	-	-	-	1
120	**151,99 x 3,53**	139,29 x 3,53	**151,99 x 3,53**	164,69 x 3,53-			1	-	151,99 x 3,53	-	-	-	-	1
130	**164,69 x 3,53**	171,04 x 3,53	151,99 x 3,53	**164,69 x 3,53**			1	-	158,34 x 3,53	-	-	-	-	1
150	**183,74 x 3,53**	**183,74 x 3,53**	177,40 x 3,53	190,10 x 3,53			1	-	171,04 x 3,53	-	-	-	-	1
180	**227, 96 x 5,34**	221,84 x 3,53	209,14 x 3,53	209,14 x 3,53			1	-	209,14 x 3,53	-	-	-	-	1
200	**247,02 x 5,34**	240,67 x 5,34	**247,02 x 5,34**	-			1	-	-	-	-	-	-	1
230	**278,77 x 5,34**	**278,77 x 5,34**	-	-			1	-	-	-	-	-	-	1

8.6.2 TELESCOPIC CYLINDERS

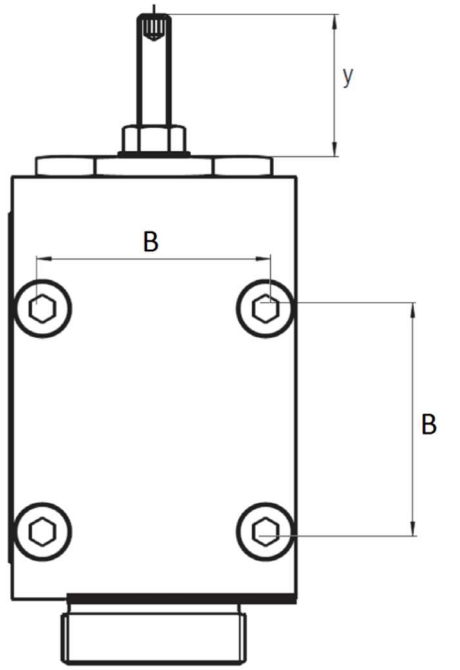
CT2 SEALS KIT

TWO STAGES TELESCOPIC CYLINDER	
Ø ROD	KIT CODE
CT – 2 – 40	8H3F0130
CT – 2 – 50	8H3F0132
CT – 2 – 63	8H3F0134
CT – 2 – 70	8H3F0136
CT – 2 – 85	8H3F0138
CT – 2 – 100	8H3F0140
CT – 2 – 120	8H3F0142
CT – 2 - 140	8H3F0144

CT 3 SEALS KIT

THREE STAGES TELESCOPIC CYLINDER	
Ø ROD	KIT CODE
CT 3 – 40	8H3F0131
CT 3 – 50	8H3F0133
CT 3 – 63	8H3F0135
CT 3 – 70	8H3F0137
CT 3 – 85	8H3F0138
CT 3 – 100	8H3F0139
CT 3 – 120	8H3F0141

8.6.3 CYLINDERS – RUPTURE VALVES



VALVOLA PARACADUTE / *RUPTURE VALVE*

TYPE	DELIVERY RANGE l/min
HC 034	5 ÷ 55
VP 114	35 ÷ 150
VP 112	70 ÷ 300
VP 200	150 ÷ 600

HOLES DISTANCE (B) FOR VP CONNECTION			
VP TYPE	Cylinder type		
	C97	T91	CF2 / CF1
HC 034	39	55	55
VP 114	55	55	60
VP 112	55	55	75
VP 200	65	65	80

8.6.4 SCREWERS TOOL

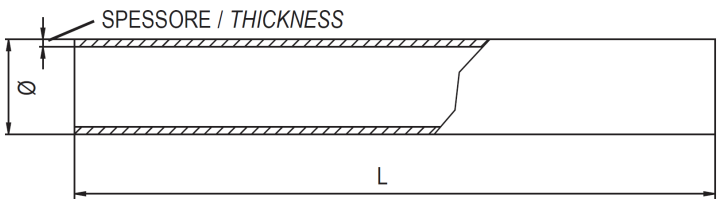
SCREW TOOL FOR ROD WITH JOINT	
Ø ROD [mm]	CODE
60	8H201723
70	8H201724
80	8H201725
85	8H201706
90	8H201726
100	8H201727
110	8H201728
120	8H201729
130	8H201730
150	8H201731
180	8H201772
200	8H201704
230	8H201705

8.6.5 OIL COLLECTION ACCESSORIES

OIL COLLECTION ACCESSORIES	
Description	Code
Elbow fitting for PVC pipe	CA100383
PVC oil collection pipe (10)	8H100006
PVC tank (5 litres)	CA102237

8.7 CONNECTIONS

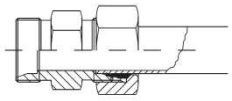
8.7.1 PIPES



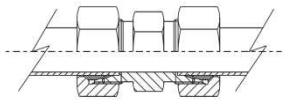
STEEL PIPES (bars of 6 m)	
DESCRIPTION	CODE
Main pipe Ø 22 x 1,55 mm	CA101725
Main pipe Ø 35 x 2,5 mm	CA100986
Main pipe Ø 42 x 3 mm	CA100988
Connection VP Ø 6 x 1m	CA101178

8.7.2 FITTINGS

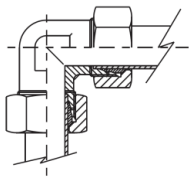
FITTINGS			
Ø Inches	Ø mm	DESCRIPTION	CODE
1/8” 1/4”	6 x 1/8”	End fitting	CA100371
1/4"	6	Line straight	CA100379
3/4"	22	Line straight	CA100380
		Line elbow	CA100376
1” 1/4	35	Line straight	CA100381
		Line elbow	CA100377
		Three – way intermediate	CA100374
1” 1/2	42	Line straight	CA100382
		Line elbow	CA100378
		Three – way intermediate	CA100375
		Reduction line Ø 42 – Ø 35	CA100384
		Three-way, 2 Ø 42 x 2” GAS	8H300135
2”	2”	Connecting nipple gas	CA101983
		Copper rove	CA101984



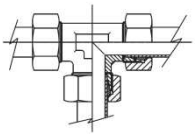
End fitting



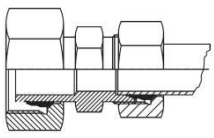
Line straight



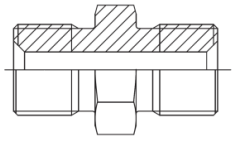
Line elbow



Three – way intermediate



Reduction line Ø 42 – Ø 35



Connecting nipple gas

9 OPERATING INSTRUCTIONS FOR HYDRAULIC COMPONENTS

With each installation is supplied a manual for hydraulic components which provides general information, assembly instructions of the hydraulic components, electrical connections, instructions for calibration, control and maintenance of the hydraulic projects, characteristics of the oils, ecc.. to facilitate the installation and the activation.

10 INVERTER

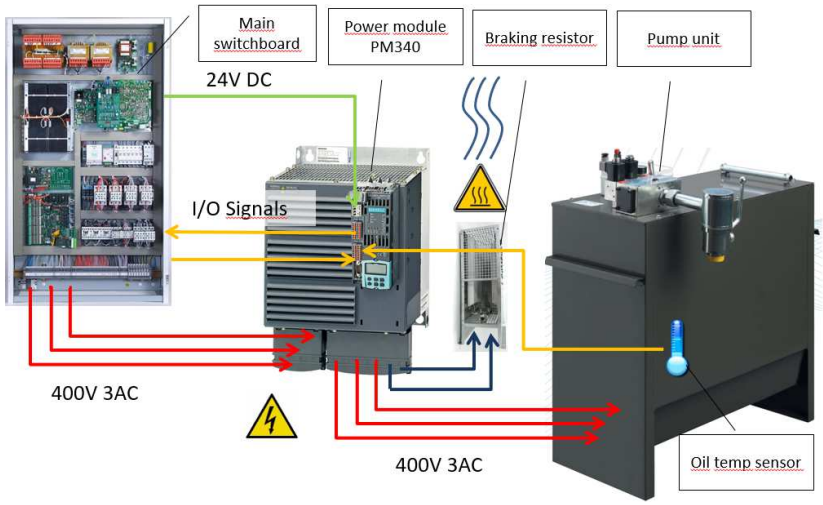
10.1 GENERAL INFORMATION

OMARLIFT offers one solution for the optimal management of the motor pump, using a Variable Voltage, Variable Frequency (VVVF) device, with a proprietary software developed and tested directly by OMARLIFT on the base of a last generation and high performance machine, using the platform:

- INVERTER SIEMENS S120

It is an inverter with a specialized software, specifically engineered for hydraulic people lift systems management, able to automatically compensate the operating conditions modifications on the entire range, with the aim to guarantee an absolute level of smoothness and high precision in landing phase to each floor and in all over conditions, without request of any subsequent adjustment or tuning, after commissioning.

Characterized by a simple open-loop configuration, that make this inverter available for new installations and modernizations too, without the complication deriving from an encoder need to evaluate the instantaneous position of the cabin, the OMARLIFT inverter is able to assure the highest precision and repeatability of the stopping space, on the order of +/-5mm in normal conditions, value which can increase till to +/-10mm at the extremes of the machine's application range, both in upward and downward directions.



This very high performance may be reached thanks to the software developed for the SIEMENS inverter, which offers a more precise instant control of the movement both upwards and downwards, because introduces an oil viscosity compensation to consider its variability with the temperature and consequently adjusts the operating parameters, through specific mappings, to which is added the load compensation (pressure). The two compensations increase the repeatability performances of the travel and assure the best results in terms of landing precision all over operating conditions (load and temperature). The oil temperature is acquired instant by instant by a thermocouple supplied by OMARLIFT.

The superior ability of the software to adapt to the actual working conditions, in most cases also avoids the adoption of an oil heater resistor in the tank, with further savings for the customer

The inverter system should be arranged in many configurations:

1. UP + DOWN: this is the top-of-the-range configuration, able to better control the up and down travel phases. It is combined with a specifically designed valve, of the HI type, and with a braking resistor,
2. ONLY-ASCENT: in this configuration, the inverter manages through the motor only the ascent phase of the lift and is combined with a normal HM mechanical valve to control and manage the descent.

3. UCM: In both configurations, the inverter solution is obviously compatible with the safety requirements for unintended car movement protection (UCM), for applications which satisfy the EN81-20/50 Normative, by adoption of an optional additional valve, HDU type, jointly with the main valve.

The advantages are:

- **Absence of starting current peaks. The maximum starting current is the rated current In.**
- **Power factor correction. Cosφ ≥ 0.98.**
- **Power saving. for the highest operating economy**
- **Comfort optimization.**
- **Inspection speed adjustable.**
- **Availability of short floor option**
- **Availability of power limitation as option, to reduce the energy supplier's power costs.**

10.2 BRAKING RESISTORS

For a correct operation, the inverters in UP+DOWN configuration must be coupled to an appropriate braking resistor, because they are not able to recover the energy developed by the electric motor during the downward travel.

OMARLIFT provides the braking resistors indispensable to the operation of each inverter, adequately sized in order to maximize the performances of the machine and guarantee the necessary reliability in all over operating conditions. For this purpose, the resistors are also equipped with a safety contact, to be connected appropriately in the control panel, for protection against overheating.

10.3 WARNINGS

Carefully follow the procedures to avoid the risk of serious accidents.

1. **The leakage current from the inverter to earth is greater than 30mA**, therefore a differential switch with **Id of at least 300mA, type B or type A**, must be provided. Regulations require the use of a cable with a section of at least 10 mm^2 for the earth connection.
2. If the parameters are incorrect, the inverter can cause the motor to rotate at a speed higher than synchronous speed. Do not run the motor beyond its electrical and mechanical limits.
3. The external braking resistor heats up during operation. Do not install it near or in contact with inflammable materials. To improve heat dissipation, it is advisable to fix it to a metal plate. Make sure it is suitably protected and cannot be touched.

10.4 POWER LIMITATION

In order to optimize installation and management costs, OMARLIFT inverters consent to implement a power limitation function, settable in factory by the manufacturer, or directly by the Customer, and customizable even after the commissioning, by adequately setting of some threshold. When the operating conditions impose the threshold to be exceeded, the high speed will be reduced in respect to the installation's rated value, and this realize, in fact, a multiple speed installation, depending from the load inside the cabin.

The guarantee of high comfort level during the travel, is assured by the fact that the power limitation activation is performed with a rounded and smoothed speed profile, without any sudden modification. When the power limitation is active, this condition remains still active till to the end of the active travel and the need to activate or not the power limitation, will be automatically evaluated at each travel, on the base of operating conditions.

In this way, the speed decrease with the load increase is functional to maintain and respect the power absorption from the power network, respecting the goal values.

10.5 CHOICE OF THE INVERTER

MOTOR – PUMP AND INVERTER COMBINATIONS

VALVE	PUMP (l/min)	MOTOR (HP)	MOTOR (kW)	Motor Current In	Max. Static press (bar)	Inverter Vacon (A)	Inverter Siemens PM340 (A)	Inverter Siemens PM240-2(A)
HI250 - 1 1/4"	55	4,5	3,3	10	25	12	10,2	26
HI250 - 1 1/4"	55	6,5	4,7	11	38	16	18	26
HI250 - 1 1/4"	55	8	5,8	15	45	23	26	32
HI250 - 1 1/4"	75	6,5	4,7	11	27	16	18	26
HI250 - 1 1/4"	75	8	5,8	15	37	23	26	32
HI250 - 1 1/4"	75	11	7,7	18	45	23	26	32
HI250 - 1 1/4"	100	6,5	4,7	11	19	16	18	26
HI250 - 1 1/4"	100	8	5,8	15	27	23	26	32
HI250 - 1 1/4"	100	11	7,7	18	37	23	26	32
HI250 - 1 1/4"	100	13	9,5	22	45	31	32	60
HI250 - 1 1/4"	125	8	5,8	15	22	23	26	32
HI250 - 1 1/4"	125	11	7,7	18	29	23	26	32
HI250 - 1 1/4"	125	13	9,5	22	36	31	32	60
HI250 - 1 1/4"	125	15	11	27	45	38	38	60
HI250 - 1 1/4"	150	11	7,7	18	24	23	26	32
HI250 - 1 1/4"	150	13	9,5	22	31	31	32	60
HI250 - 1 1/4"	150	15	11	27	36	38	38	60
HI250 - 1 1/4"	150	17	13	29	40	38	38	60
HI250 - 1 1/4"	150	20	15	33	45	46	45	60
HI250 - 1 1/2"	180	15	11	27	29	31	32	60
HI250 - 1 1/2"	180	17	13	29	33	38	38	60
HI250 - 1 1/2"	180	20	15	33	38	46	45	60
HI250 - 1 1/2"	180	25	18	42	45	61	60	75
HI250 - 1 1/2"	210	15	11	27	23	31	32	60
HI250 - 1 1/2"	210	17	13	29	27	38	38	60
HI250 - 1 1/2"	210	20	15	33	32	38	38	60
HI250 - 1 1/2"	210	25	18	42	40	61	60	75
HI250 - 1 1/2"	210	30	22	51	45	61	60	75
HI250 - 1 1/2"	250	20	15	33	27	38	38	60
HI250 - 1 1/2"	250	25	18	42	34	61	60	75
HI250 - 1 1/2"	250	30	22	51	40	61	60	75
HI250 - 1 1/2"	250	40	29	67	45	87	90	110
HI600- 1 1/2"	300	20	15	33	22	38	38	60
HI600- 1 1/2"	300	25	18	42	28	61	60	75
HI600- 1 1/2"	300	30	22	51	34	61	60	75
HI600- 1 1/2"	300	40	29	67	45	87	90	110
HI600 - 2"	380	20	15	33	17	46	45	60
HI600 - 2"	380	25	18	42	21	61	60	75
HI600 - 2"	380	30	22	51	26	61	60	75
HI600 - 2"	380	40	29	67	37	87	90	110
HI600 - 2"	380	50	37	82	45	105	110	145
HI600 - 2"	500	30	22	51	18	61	60	75
HI600 - 2"	500	40	29	67	26	87	90	110
HI600 - 2"	500	50	37	82	34	105	110	145
HI600 - 2"	500	60	44	101	41	140	145	178
HI600 - 2"	500	70	51	118	45	170	178	205
HI600 - 2"	600	40	29	67	18	87	90	110
HI600 - 2"	600	50	37	82	25	105	110	145
HI600 - 2"	600	60	44	101	32	140	145	178
HI600 - 2"	600	70	51	118	38	170	178	205
HI600 - 2"	600	80	59	137	45	205	210	250

ROD DIAMETER (mm) \ Velocità stelo Rod speed (m/s) @2750 rpm – PUMP (l/min)	55	75	100	125	150	180	210	250	300	380	500	600
50	0,47	0,64	0,85									
60	0,32	0,44	0,59	0,74	0,88							
70	0,24	0,32	0,43	0,54	0,65	0,78	0,91					
80	0,18	0,25	0,33	0,41	0,50	0,60	0,70	0,83	1,00			
85	0,16	0,22	0,29	0,37	0,44	0,53	0,62	0,73	0,88			
90	0,14	0,20	0,26	0,33	0,39	0,47	0,55	0,66	0,79	1,00		
95	0,13	0,18	0,24	0,29	0,35	0,42	0,49	0,59	0,71	0,89		
100	0,12	0,16	0,21	0,27	0,32	0,38	0,45	0,53	0,64	0,81		
110	0,10	0,13	0,18	0,22	0,26	0,32	0,37	0,44	0,53	0,67	0,88	
120	0,08	0,11	0,15	0,18	0,22	0,27	0,31	0,37	0,44	0,56	0,74	0,88
125	0,07	0,10	0,14	0,17	0,20	0,24	0,29	0,34	0,41	0,52	0,68	0,82
130	0,07	0,09	0,13	0,16	0,19	0,23	0,26	0,31	0,38	0,48	0,63	0,75
140		0,08	0,11	0,14	0,16	0,19	0,23	0,27	0,32	0,41	0,54	0,65
150		0,07	0,09	0,12	0,14	0,17	0,20	0,24	0,28	0,36	0,47	0,57
160			0,08	0,10	0,12	0,15	0,17	0,21	0,25	0,32	0,41	0,50
170			0,07	0,09	0,11	0,13	0,15	0,18	0,22	0,28	0,37	0,44
180			0,07	0,08	0,10	0,12	0,14	0,16	0,20	0,25	0,33	0,39
200				0,07	0,08	0,10	0,11	0,13	0,16	0,20	0,27	0,32
230					0,06	0,07	0,08	0,10	0,12	0,15	0,20	0,24

10.6 ELECTROMAGNETIC COMPATIBILITY (EMC)

Together with a system configuration in conformity with EMC standards, the line filters limit the conducted interference emitted by the Power Modules to limit values according to standard EN61800-3, which defines the installation Ambient and the Category of Drive Systems from C1 (best) to C4 (worst).

All POWER MODULES (PM) delivered are provided with line filter, and they are in conformity with category C3 (industrial) in accordance with the standard EN 61800-3.

The PM with a suitable line filter shall correspond to the category C2 for domestic installations, provided that:

1. They are installed and put into service by a specialist (according to the definition given by the normative), in compliance with the limit values for electromagnetic compatibility.
2. The below shown additional requisites are respected:

- Connection by use of a shielded cable at reduced capacity.
- Motor cable shorter than 25 m in PM BlockSize (100 m in PM Chassis).
- Pulse frequency ≤ 4 kHz in the PM BlockSize (≤ 2 kHz in the AM Chassis).
- Current ≤ nominal input current in the technical data.

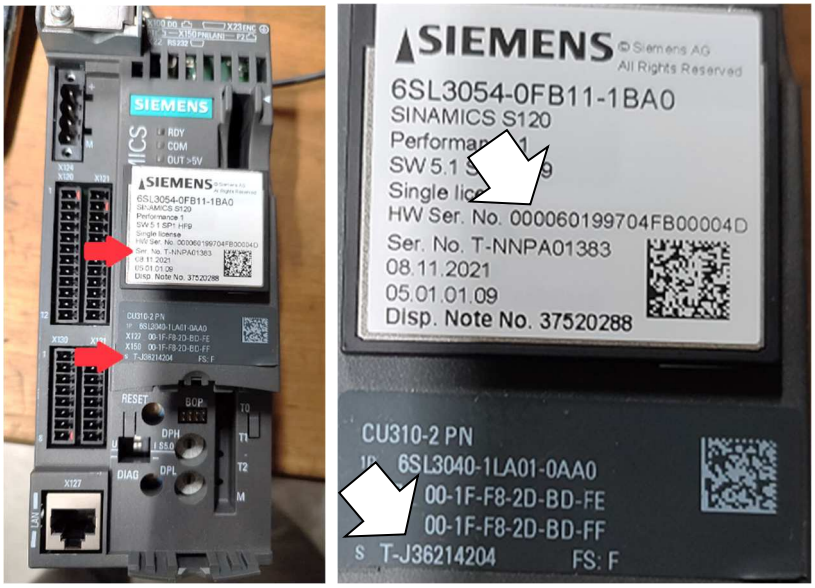
10.7 SPARE PARTS

OMARLIFT Service is at your disposal for any assistance, software or spare parts for the existing working machines.

⚠Control Units (CU) and memory Compact Flash cards (CFC), are not compatible between inverters of the two series PM 340 and PM240-2 and they cannot be exchanged between them. Specific spare parts are required for each machine family

⚠For safety issues, CUs and CFCs cannot be used on other machines, also inside the same product family. In case of a CFC put on another CU in respect to the original configured one, a blocking error will be created

⚠In case of a re-programming request for one inverter, it is mandatorily requested to give to OMARLIFT Service the serial number of both, CU and CFC for the specific installation, because they have to be necessarily matched together, in order to assure the correct functionality of the system.



11 ELECTRONIC VALVE

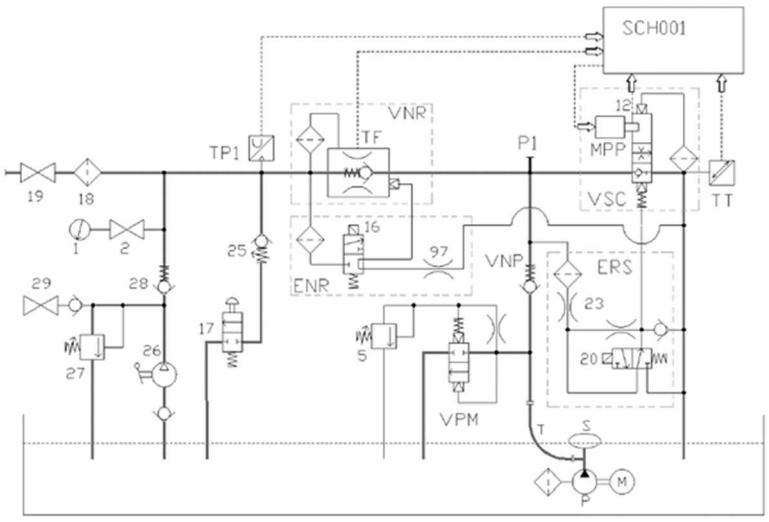
OMARLIFT range of products, make available a complete offer of pump-units with the new electronic HEVOS HE valve, highly performing in all over the operating conditions.

Available in 3 versions, depending from the maximum flow rate, the HEVOS HE valve is engineered with a closed loop technology, thanks to flow, temperature and pressure sensors. The stepper motor (MPP) which manages the flow regulator piston, is piloted at each moment according to pre-set maps on the base of instantaneous operating parameters, constantly checking the result obtained, to guarantee repeatability and speed accuracy, as well as smoothness in stopping at the floor in all conditions.

Main HE characteristics are:

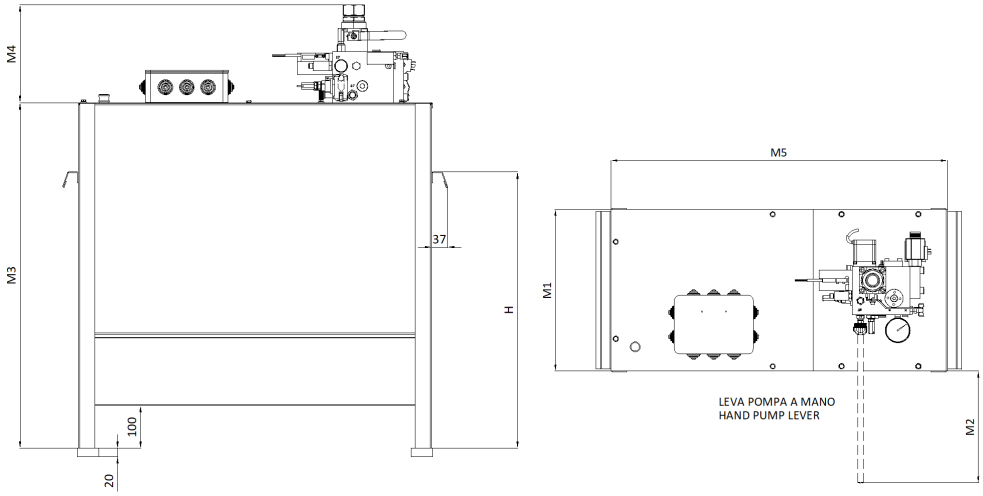
- Dedicated electronic board that manages all functionalities, equipped with activable Self-Learn mode for a high accuracy in the control of the travel, with a minimum length of the slow speed section, before the stop at the floor, for a higher comfort and reduced travel time and energy consumption
- CANopen interface with the control panel
- Multivalve operation mode with series wiring to the control panel with master/slave logic (1 master board+ max. 7 slaves boards) or with parallel wiring.
- Increased energy efficiency and lower oil heating, that make HEVOS HE solution fulfilling requirements for very high traffic systems.
- Automatic compensation of pressure and oil viscosity modification, for constant performances
- Motor starting and stopping directly managed by the valve's electronic board logic, using specific I/O signals exchanged with the control panel.
- Smartphone interface for quick and easy configuration and diagnostic, using a dedicated App, freely downloadable from Google Play Store and Apple Store
- Integrated valve layout on tank, completely inside the external profile of it, with vertical oil pipe exit joint and main tap, for a better compactness
- Without encoder need
- Specific electric control panels (in option), specifically configured and tested for HEVOS HE valve logic.
- Wide range that covers all applications exigence (from 8 to 600l/min). For the motor-pump-tank combinations, refer to paragraphs 2.5, 2.6, 2.7.
- UCM device integrated into the HE valve, with TÜV Süd Certificate, according to EN81-20/50 normative, with the below characteristics:

VALVE MODEL	RANGE TEMP	OIL VISCOSITY	PRESSURE	CERTIFIED FLOW RATE	
HE100	5-70°C	14-290cSt	10-70bar	8-100 l/min	
HE250	5-70°C	14-290cSt	10-50bar	20-250l/min	
HE650	5-70°C	14-290cSt	10-45bar	250-700l/min	



TF Flow meter
TP1 Pressure meter
TT Temperature meter
ENR VNR valve unblock solenoid valve
ERS VSC valve unblock solenoid valve
MPP VSC valve command Stepper motor
VNP Pump no return valve
VNR No return and downstroke safety valve
VPM Pump maximum pressure valve
VSC Flow control valve
P1 Auxiliary micro-levelling port
5 Max pressure valve adjusting screw: screwing increases (+), unscrewing decreases (-)

HEVOS HE - Hydraulic scheme



VALVE TYPE	TANK TYPE	USEFUL OIL *liters*	M1 *mm*	M2 *mm*	M3 *mm*	M4 *mm*	M5 *mm*	H *mm*
HE250	110/S	65	300	336	702	218 (280 main tap lever)	700	640
HE250	135/S	100	300	336	902		700	640
HE250	210/S	140	400	276	810		830	650
HE250	320/S	220	460	231	950		950	650
HE250	450	310	700	106	952		1000	650
HE650	320/S	220	460	259	950	286 (330 main tap lever)	950	650
HE650	450	310	700	110	952		1000	650
HE650	680	490	800	69	1002		1250	650
HE650	900	690	800	360	1202		1250	650
HE650	1000	790	800	360	1302		1250	650

Omarlift è sempre aggiornata sulle nuove certificazioni, in uso e future.
Omarlift is always up-to-date on the new certifications, actual and futures.

Direttiva ascensori 95/16/EC
Normativa EN 81-2 + A3
Normativa EN 81-41
Direttiva macchine 2006-42-CE

Lift directive 95/16/EC
Norm EN 81-2 + A3
Norm EN 81-41
Machine directive 2006-42-CE

Direttiva ascensori 2014/33/EU
Normativa EN 81-20
Normativa EN 81-50

Lift directive 2014/33/EU
Norm EN 81-20
Norm EN 81-50

Con una adeguata installazione eseguita da personale qualificato i dispositivi elettrici rispondono ai requisiti EMC (EN 61800-3)
With Proper Installation carried out by the Personal Qualifications the electrical devices are capable to satisfy: EMC requirements (EN 61800-3)

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