



## DT-325 TECHNICAL DESCRIPTION



July 2017



# ARMO INTRODUCTION

## DOCK LEVELLERS UNIT

Born in 1972 and leader in the logistic and loading bays, Armo is nowadays the most vanguard industry in the dock leveller field because we have made investments in technology, in quality and in production efficiency. Our plants, totally robotized, produce a dock leveller every 15 minutes by assuring constant and total quality whilst respecting the Security and Surroundings Regulations.

Armo develops, day after day, its productive quality, the efficiency of the industrial planning and the skill of its staff.

Today Armo has an international tested vocation, leader on the Italian market with a wide range of products and equipment for the industrial logistics.

We use only the best materials and components of high quality. We manufacture, test and certify every dock leveller in order to deliver what you expect from a dock leveller: long life, security, reliability and quality.

Armo dock levellers, in the total observance of security principles, are suitable to operate, to be adjusted and to be maintained, if effected according to the foreseen conditions, and without causing risks to people, if these risks are the result of a probable anomalous situation. Armo dock levellers are safe against damage.

The conformity to the primary security requirements is proved by the Company IEC Industrial Consultants srl – certification organization “Authorisation Ministry of Industry and Trade – G.U n. 255 of 31-10-2000” – who tested, with positive result, a dock leveller ARG1 38C3 TS, on 22/01/2003, by our factory in Collegno (TO).

Armo dock levellers, like all other our products, are covered by Assurance of personal injury for industrial society according to the CEE 374/85 regulations. The policy has been issued with Reale Mutua Assicurazioni and it foresees also the R.C.O Insurance.

We are at your full disposal for everything you deem necessary.

Best regard

**ARMO S.p.a.**  
Technical-Commercial Dpt.



(+39)-011.71760.11



info@armoweb.com

1 – DT-325



(+39)-011. 71760.19



<http://www.armoweb.com>

Armo is able to supply quick and satisfying answers for all problems that our customers may encounter; it could be a request of spare parts easily to meet thanks to our well-supplied warehouse or in case of request of special lifting tables, realized according to the customers' requests.

## 1.1 Made in Italy

Our dock leveller are totally designed and manufactured in our factories, in the district of Turin.

We take your attention to our factory in None, realized in collaboration with ABB Flexible Automation, which is the most vanguard worldwide structure in the carpentry field for dock levellers production. With the last robotized plant our production capacity is of 1 dock leveller every 15 minutes, with the possibility of a continuous production 24 hours per day.

Armo brochure "the future now" is a part of this description.

## 1.2 Product quality warranty

The robotized process assure Armo dock leveller against typical mistakes due to human action and they have an high reliability in comparison to a traditional manufacturing.

90% of weld operations is robotized: our progressive robots assure a continuous, automatic quality check, without suffering of external factors, such as a feeding voltage modification and keeping unchanged welding parameters established during program phase.

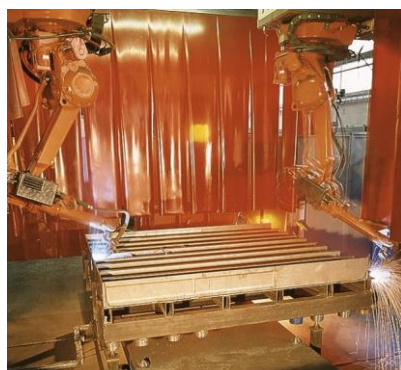
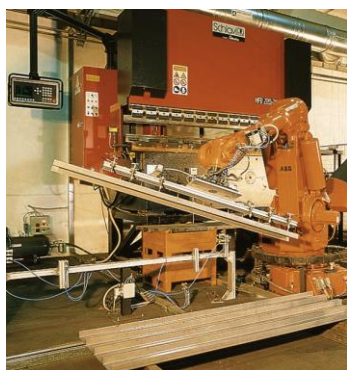
The robotized plants, repeating the correct operations sequence cycle by cycle, assure that all products have the same features during the time. It is possible to keep a constant quality level by means of production process automation.

Quality warranty, always Armo first purpose, has become, thanks to the robots, a standard, which can be remarked by buying one of Armo products.



## 1.3 Safety and improvement of the working place

Working rules and D.L. 81/08 dictate strict regulations concerning the safety of the working place. Using a robot in our main working areas, bending, welding and milling machines, permits to solve all sort of problems, related to these important aspects.



Working in the best possible conditions, is surely an advantage; not only for worker's health, but also for the quality of the job made. This is independent from the strict rules which cover health and working surroundings.

Armo is a modern company able to combine the workers needs during the productive cycle with the economic aspects, in order to obtain the best final product

## 1.4 Film

The QR code permits to see a self-explanatory film concerning the main phases of our production and final trial



Our film is also available on the website, at the page "VIDEO":

**[www.armoweb.it](http://www.armoweb.it)**



(+39)-011.71760.11



[info@armoweb.com](mailto:info@armoweb.com)

3 – DT-325



(+39)-011. 71760.19




<http://www.armoweb.com>

## 2.1 Regulations to be applied to dock levellers

Every dock leveller will have to strictly follow the 98/37/CE of June 22nd 1998, the EN 292/1 and EN 292/2 Machinery Safety: general technical principles for design regulation, and the EN 1398 European Regulation of type C. In the first part of the EN 1398, it's said that all national rules conflicting with it have to be withdraw within February 1998, and the EN 1398 have to be applied without making any modification. **Laws cannot be discussed, but only applied.**

## 2.2 Conformity declaration

Our dock leveller is a mono-block structure; all the safety requirements are included to avoid, as much as possible, any risk. Each dock leveller is tested in our factory and only after positive result the conformity declaration is signed according to UNI CEI EN 45014. The signature of this declaration allows the CE marking.

<h1 style="text-align: center; margin: 0;">armo</h1> <p style="margin: 5px 0;">Via R. Di Luxembourg 1 - 10093 Collegno (TO) Tel: 011 - 71760.11 Fax: 011 - 71760.19</p>	
Rampa Modello :	
Numero di fabbrica:	
Anno di fabbricazione:	
PESO MAX carrello elevatore:      Kg.	

## 2.3 User and instruction booklet

The user's and instruction booklet contains all documents that state the conformity of the machinery to the regulation, the machinery description, the foreseen usage conditions and all the installation, set-up, adjustment, utilization, maintenance and repair notes. The user's and instruction booklet is complete with electric and hydraulic diagrams.

## 2.4 Drawings and technical booklet

For each dock leveller, it is foreseen a product technical booklet stating all the structure calculations and safeties. The technical booklet is available on request by the Authorities to verify the conformity of our dock levellers to all safety need stated by rules EN 1398 and UNI EN ISO 12100-1:2005.



### 3.1 Dock leveller purpose (EN 1398 – 3.1)

The dock leveller is a static or mobile equipment, which is used to fill the distance between a loading dock or similar loading areas and the loading surface of a vehicle that can be at different levels.

The dock leveller is not designed to lift or lower goods.

The operation is therefore not intended to lift the load, but only to modify the position of the dock leveller, without any load.

The dock leveller is not suitable to carry loads if it is not perfectly resting in a balanced position on the vehicle surface.

### 3.2 Tripping risks due to the horizontal oscillation of the truck

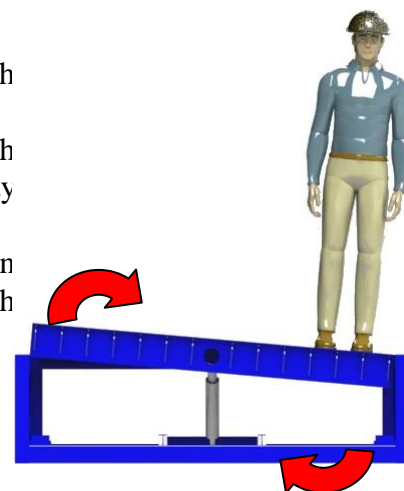
#### (EN 1398 – 5.2.6)

In its working position, the dock leveller must be left free of swinging both vertically and crosswise.

Crosswise swinging, that equals to 5% of the total dock leveller width approximately, is obtained as a result of the particular structure flexibility of the Armo dock levellers.

The torsion value is measured without any load, the lip perfectly laying on the vehicle surface, and is indicated, in mm, in the technical data of each leveller.

This characteristic is obtained by using a series of beams welded directly below the upper frame, with a system similar to the lorries trays chassis.



### 3.3 Tripping risks due to the vertical oscillation of the truck

#### (EN 1398 – 5.2.7)

In working position, the dock leveller must be free to swing vertically in order to follow the movements of the bed trailer. An electro-valve makes the cylinder drainage and renders the leveller fluctuating.

### 3.4 Dangerous situation

If during the loading phase, an electrical problem causes the leveller arrest, and consequently there is a danger situation, in order to eliminate it, as written in the UNI EN ISO 12100-1:2005, you duplicate the critical components and the automatic surveillance. Practically, on all Armo dock levellers, there is a valve group, which permits to complete in total safety and without any limitations the loading phases (the leveller follows the movements of bed of the docked trailer).

**Armo dock levellers have no problems due to electric black-out**

### 4.1 Visibility of raised or lowered position of dock leveller

The visible lateral components of dock levellers, in raised or lowered position, are clearly marked with yellow/black stripes.

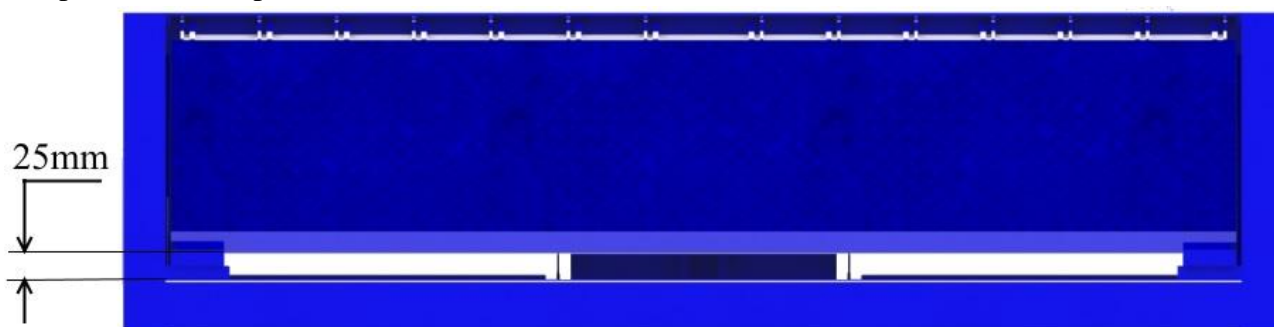
### 4.2 Support device for maintenance intervention

Dock levellers are fitted with a mechanical device which, when operated, will support the leveller at its maintenance position without load. This device is part of the dock leveller and it is not possible for it to be unintentionally disengaged.

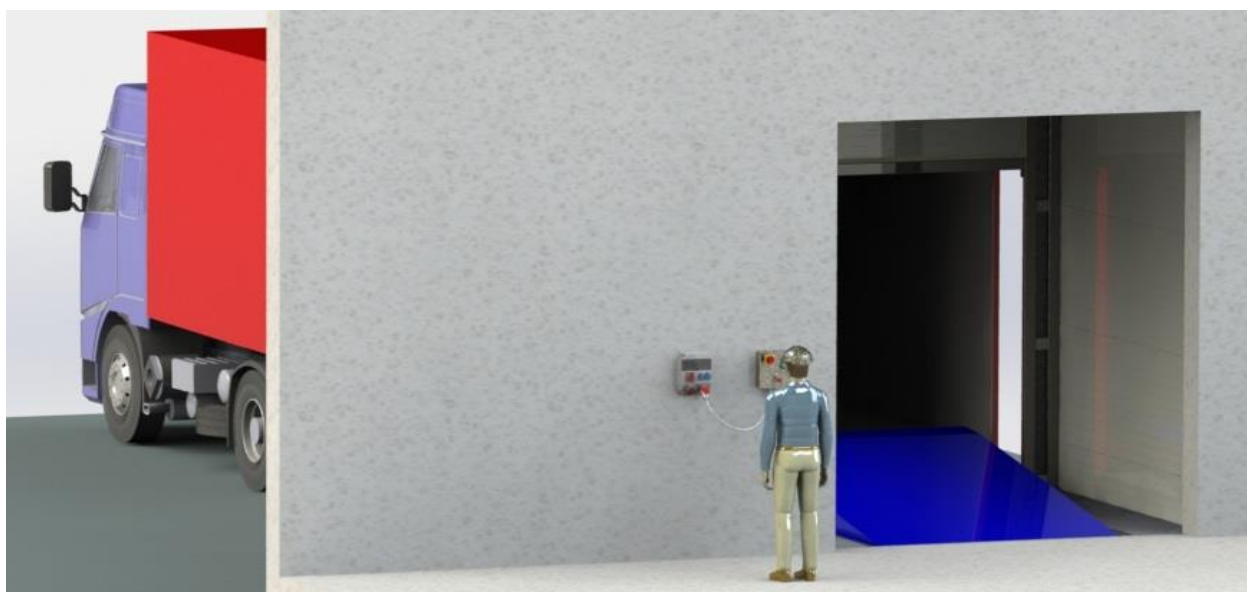
### 4.3 Crushing and shearing risks

Crushing and shearing hazards between pit edges and dock levellers frame are avoided by using telescopic protection panels.

The crushing and shearing hazards between the folded lip and the dock leveller frame are safeguarded with a vertical safety distance of at least 25 mm between the lip edge and the frame components in rest position.



Crushing and shearing hazards between dock leveller and beds of the trailers are safeguarded if the control panel will be placed in a position to let the operator easily see all dock leveller movements. We supply one control panel for each dock leveller.



### 4.4 Automatic safety device

Armo dock levellers are provided with an emergency stop device, located directly in the raising cylinder, which, if the loading vehicle drives away before the dock leveller has returned to its resting position, reduces the lowering speed to not more than 0.05 m/s. The EN 1398 (par. 5.4.1), says that all parts subject to the overloading due to automatic security device must be designed to resist to this overloading pressure. In our dock levellers, the cylinder is designed to stand a high pressure. The operation of the security valve with a weight more than 2000 Kg, can cause permanent structure damages. The permanent deformation of the structure is foreseen by the European Regulation EN 1398, because a rigid structure could not suit the upper frame torsion, principal security requirement of a dock leveller (par. 5.2.6).

### 4.5 Dock leveller stop and automatic re-set prevention

Activating the main switch and in the event of a power problem, all dock levellers movements are stopped. The power could be re-activated only by a manual action of the operator, to prevent any uncontrolled movement of the dock leveller.

### 4.6 Other safety requirements

We remind you that all our dock levellers satisfy the EN 1398 European Regulation of type C as well as the safety requirements foreseen by Directive 2006/42/CE dtd. 17 Mai 2006 and UNI EN ISO 12100-1:2005 safety of the machine: main general technical and planning principles.

Additional information on the above is available by contacting our Quality Team.



(+39)-011.71760.11



info@armoweb.com

7 – DT-325



(+39)-011. 71760.19



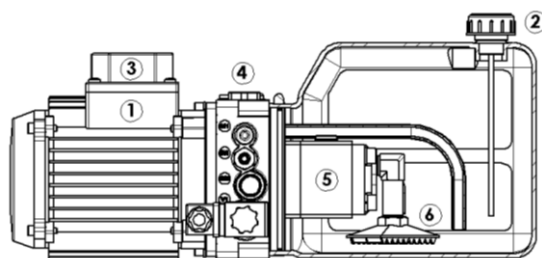
<http://www.armoweb.com>



## 5.1 Power pack

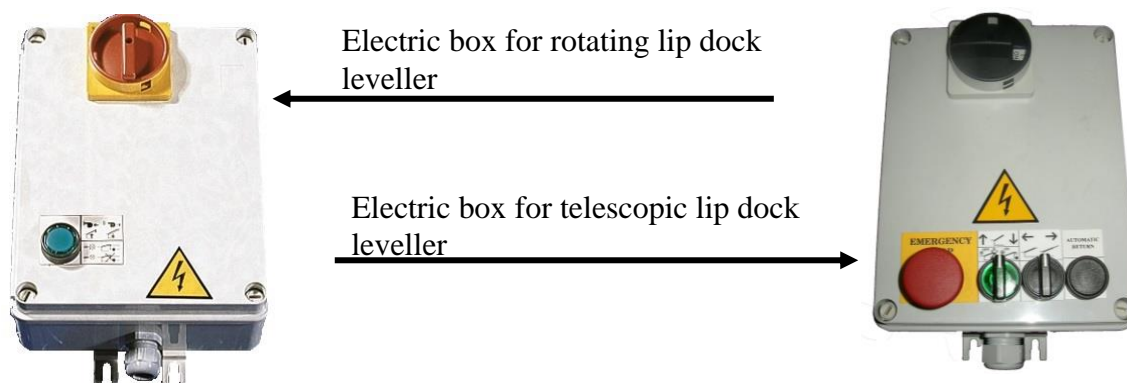
Power pack is with outside motor, placed under the frame in a frontal position, for an easy access in case of maintenance. Our valve group, as told previously, permits, in case of electrical fault, to finish the loading phases in total safety and bring back the leveller in its rest position: you just have to close the lip manually, unplugging the flexible hose; afterward you can bring the dock leveller in its original position, by positioning a weight of about 600 kg. on the frame.

Every dock levellers has its own power pack.



## 5.2 Electric box

Electric box can move only the leveller or combined with the sectional door, in case the only leveller foreseen an automatic cycle with one button, if the leveller is with rotating lip, or with double selector and automatic return in case of telescopic leveller. The emergency button is integrated with the main switch and stops the leveller moving in case of danger. The protection degree against electric risks is IP 56. There is the possibility to insert a limit switch ( excluded from our controls) in order to prevent that the leveller starts to move before that the sectional door is completely open.



## 5.3 Connection wire power pack – electric box

Connection wires of electro-valve and motor are 7.5 mt length and flame resistant. They are cabled in an only specific cable, ready to permit an easy connection to the electric box. The cable length is enough for positioning the electric box in a suitable area. Should you need a longer cable, it is possible, by request and on small extra cost, to have a cable of 12 mt length.

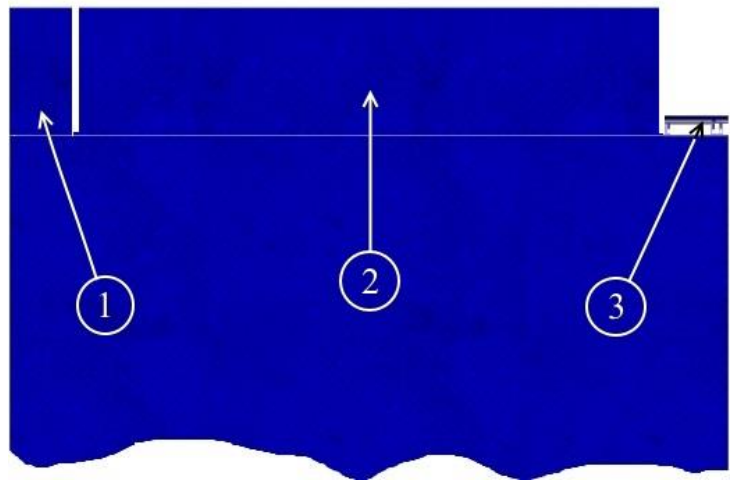
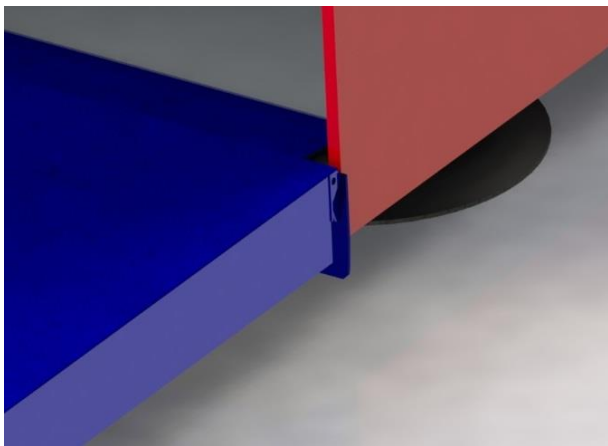
We remind that the rule imposes that the operator can observe all movements of the leveller; this means that the electric box has to be positioned near the leveller. Electric wire is supplied already connected to the power pack.

## 5.4 Lip

A robotized milling machine automatically works our dock leveller lip. The milling process includes the bevelling along the entire length of the lip and the breaking of the milled corners. This avoids any damages to forklift wheels during loading operations.

The lip is provided folded to perfectly lay to the truck body.

If you need to load trucks with different width, it's possible to use a 3-sector lip: a central sector and two lateral ones that are automatically connected by a sphere device. It's possible to pull the lateral sectors down when you don't make use of them, by performing a small manual pressure. Versatility of dock levellers width allows to suit the real body truck dimension.



Lip rotates on self-cleaning hinges: dirty and various materials cannot interfere with the lip movement.

## 5.5 Lip operation

Lip works thanks to a single-acting cylinder in case it is rotating; a double-acting cylinder for the telescopic version.

## 5.6 Capacity

Nominal charge 6000 kg, as per edited in the **EN 1398 rule**.

The nominal charge is the weight of the maximum moving charge, including goods, operator and forklift.

In its resting position, with the lip in vertical position and on its suitable stops, the dock leveller forms a level surface with the floor and it can over driven in all directions.

By request, if you need to have a 3 wheels forklift passage or with lower  $\phi$ , the upper frame will be reinforced by two more beams. The stronger upper frame will reduce the lateral flexural torsion.

## 5.7 Slope

According to the regulation of reference, the dock leveller working slope cannot overtake the 12,5% of its length ( floorboard with lip), equal to a slope angle of  $\pm 7^\circ$ .

• **Negative slope:**

The negative slope is due to stop gear changes.

If you are in loading conditions in which the dock leveller is completely in negative slope and against the vehicle's floor, make sure that that in the loading phase the floor itself won't reduce even more its height from the ground, since the dock leveller couldn't balance the gap and, under the pressure due to the vehicle's passage, there is a risk of lasting and irreparable damages for the correct operating and security of the dock leveller itself.

• **Positive slope:**

The provided positive slope for the operating is usually mechanically limited on the dock levellers; regarding the lip rotating dock levellers, it is highlight by fluorescent stripes placed on oscillating, lateral panels (realized to avoid shearing problems, according to the **EN 1398 Rule**).

**CORRECT SOLUTION:**

- FLUORESCENT STRIPE
- ANTISHEARING  
TOTAL PROTECTION

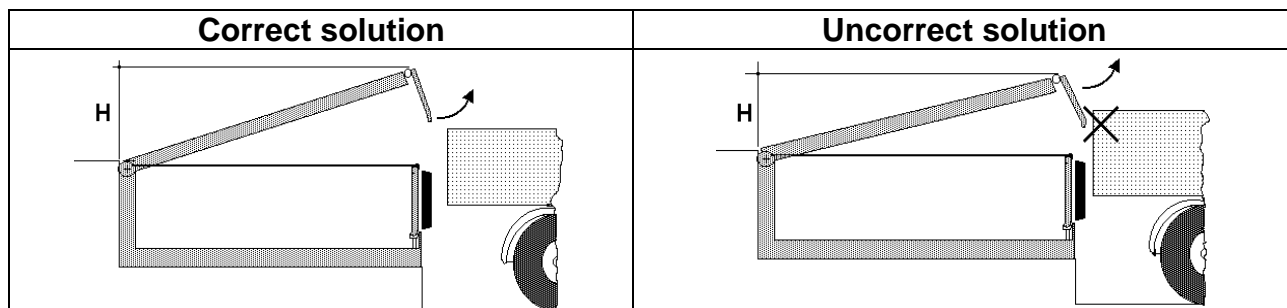


**UNCORRECT SOLUTION:**

- ANY  
HIGH STROKE  
INDICATOR
- SHORTAGE  
LENGTH  
PROTECTION  
ANTISHEARING



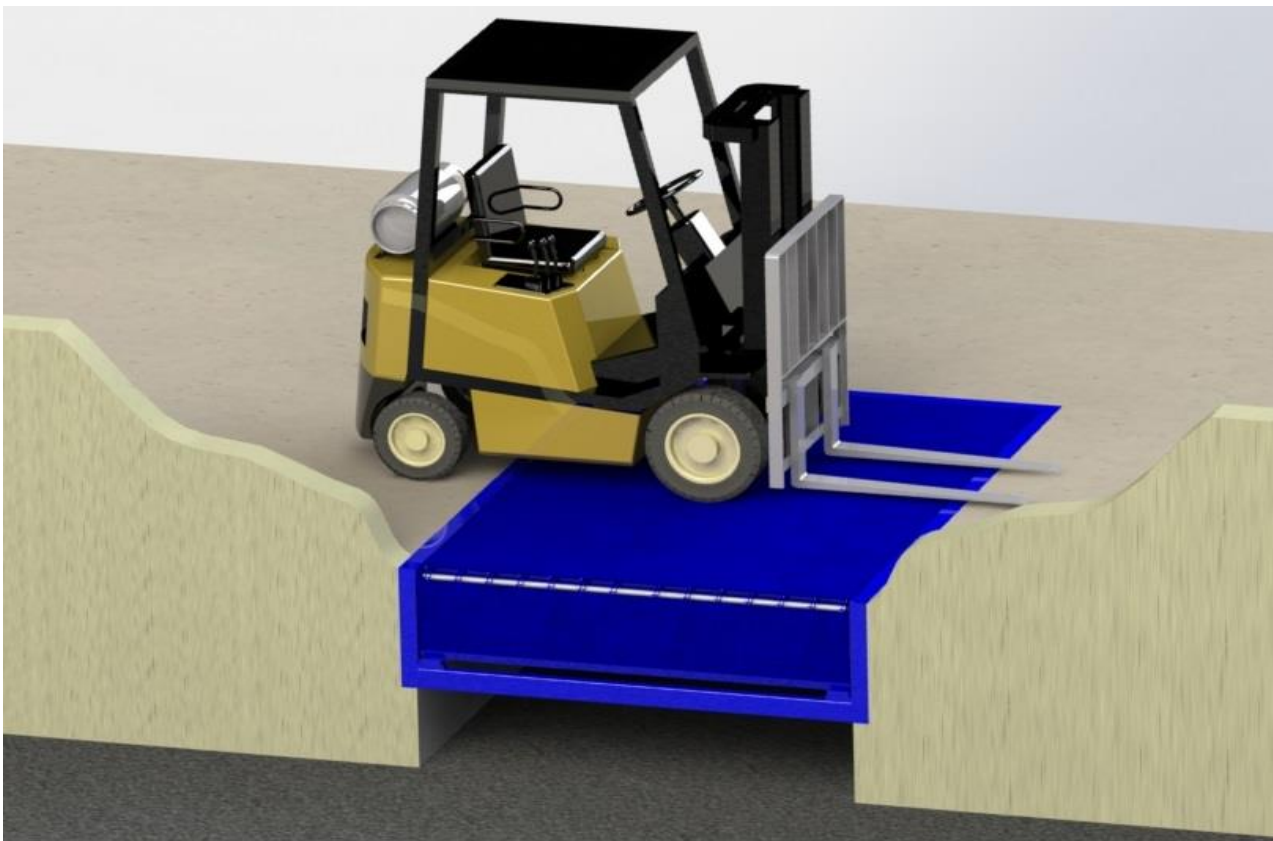
Being a higher **stroke** included, in order to make the rotating lip's opening easier and not to make it bump against the trucks, verify during the close-proximity-loading floor-way down that the fluorescent stripe limit gets reached or not.



### 6.1 Armo dock leveller structure

Armo dock levellers, with the exception of the SF method (pit mounted) are a mono-block self-supporting structure, complete with lateral walls and main supporting. There are many advantages to this structure:

- It is possible to incorporate all safeties in order to eliminate, for what possible, all risks, as foreseen by the EN ISO 12100 rule
- Internal Yellow and black stripes for reporting.
- Easy installation and moving.
- Pit does not require smooth walls, but can have coarse finish.



**All this can be resumed in saving money on civil works freight  
for realizing the pit.**

### 5.2 Pit dimensions

Pit drawings with the required dimensions for realizing the pit are at your customers' disposal both in paper and electronic format.

Should you require more information, our technical department is at your disposal.

**tec@armoweb.com**

### 7.1 Quality of the employed components

All Armo dock leveller components are chosen according to only one principle: to rigid respect of quality parameters, to solve all the expressed and unexpressed exigencies to his customers. The hydraulic power pack, for example, is produced by Oil System company, and is one of the best material available on the market. Further on, the power pack installs a particular valve group, where, in case of an electric problem, assures the maximum security in every situation. Each cylinder is tested and is designed to stand the pressure up to 1000 atm.

### 7.2 Easy maintenance

All components of Armo dock levellers have been studied to allow an easy maintenance or replacement. The cylinders, for example, are fixed by means of pins, allowing an immediate and intuitive disassembly of the same ones without unsoldering other items. The hydraulic power pack is placed in such a position of easy accessibility without obliging the installer to go under the upper frame to do his job anymore.



### 7.3 Components unification

The continuous technical renewal of Armo products, has obliged our Society to make technical choices able to grant to the customer additional features. All Armo dock levellers of the same type (RSA, Extensible lip 500 mm, Extensible lip 1000 mm) have common components such as hydraulic power pack, lip and raising cylinder, control panel. In any case, Armo grants a 48h delivery service for spare parts.

### 7.4 Respect of the delivery terms

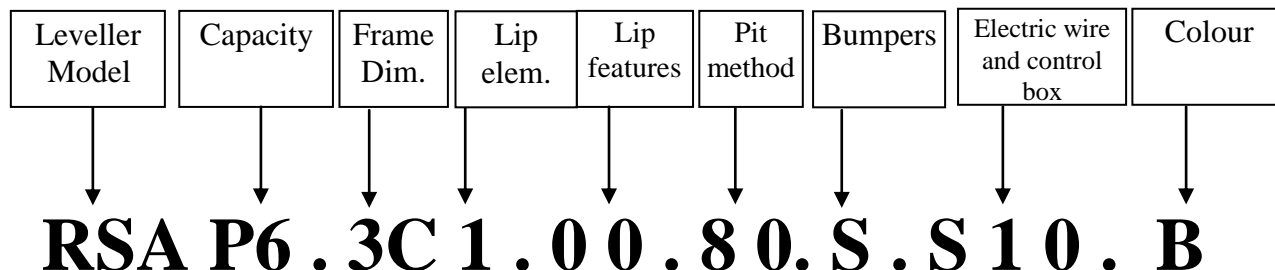
Thanks to the productive flexibility, guaranteed by our robots installations as well as a prompt availability of all raw materials and purchased components, guarantees the respect of the delivery terms agreed. We take all risks coming from possible delays of delivery caused by our suppliers.



# CHAPTER 8 DIMENSIONAL FEATURES

## 8.1 Legend

To identify Armo dock levellers we use a composed code, as follows:



<b>MODEL:</b>	<b>RSA:</b> Armo dock leveller RSA Standard series <b>RXE:</b> Armo dock leveller Telescopic lip L=500 mm <b>RZE:</b> Armo dock leveller Telescopic lip L=1000 mm	
<b>CAPACITY:</b>	<b>P6:</b> 6000 Kg distributed	
<b>FRAME DIMENSIONS:</b>	<b>LENGHT</b>	<b>WIDTH</b>
	<b>1:</b> 2000 mm <b>2:</b> 2500 mm <b>3:</b> 3000 mm <b>4:</b> 3400 mm	<b>C :</b> 2000 mm <b>D :</b> 2200 mm
<b>LIP ELEMENTS:</b>	<b>1:</b> 1 element <b>3:</b> 3 elements	
<b>LIP FEATURES:</b>	<b>00:</b> Lip lenght (standard)	
<b>PIT METHODS:</b>	<b>40:</b> "BOX" <b>50:</b> "UNIVERSAL" <b>80:</b> Reversed angle <b>SF:</b> Pit mounted <b>SO:</b> On scaffold	
<b>BUMPERS:</b>	<b>E:</b> Excluded <b>S:</b> included	
<b>ELECTRIC BOX(1):</b>	<b>S_:</b> standard leveller with rotating lip <b>T_:</b> telescopic leveller	
<b>ELECTRIC BOX(2):</b>	<b>_1:</b> Dock leveller only <b>_2:</b> leveller + door <b>_3:</b> Leveller + automatic return <b>_4:</b> Leveller + door + automatic return	
<b>CONNECTION WIRE LENGHT:</b>	<b>0:</b> standard (L= 7.5 m) <b>1:</b> longer ( L= 12 m)	
<b>COLOUR:</b>	<b>B:</b> Blue RAL 5010 <b>X:</b> Special	

**Example:** RSAP6.3C1.00.00E.S10B Dock leveller is a Standard rotating leveller, 6000 kg capacity, standard control box, 3000Lx2000W, reversed angle frame, lip in 1 pc, bumpers excluded, Blue 5010



**Standard bumper**  
Stiff rubber 85x80 h400



**Jumbo bumper**  
Stiff rubber 250x100 h450



**Front plate**  
Zinc steel for Jumbo bumper



**Rear plate**  
Steel for Jumbo bumper



**ARMOSTOP**  
Reinforced oscillating buffer



**Wedge**  
With integrated limit switch



**Traffic light with 2 Lights**  
24 V CC LED



**TOTEM light**  
A doubled-telescopic arm with LED light



**Sensors**  
Truck approaching for equipment approval



**Armo SHIELD**  
Guide protections for doors



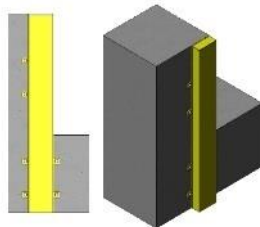
**Wheel guide**  
To center the truck  
Ø139 L=2000mm



**Outside numbering**  
FOREX panel with sticker



**Side-seal**  
Seal at the edge of the leveller



**Iron buffers**  
Bay H x L=170 x P≈80mm  
- BLACK



**Limit switch**  
Leveller-Door



**Traffic light system**  
Wedge +2 light and 1 box with sound alert

## Dock levellers' conformity declaration Facsimile



### CONFORMITY DECLARATION (Directive machine 2006/42/CE Attachment II A)

ACCORDING TO RULES UNI CEI EN ISO/IEC 17050-1:2010 and  
UNI CEI EN ISO/IEC 17050-2:2005

**Mod. RSAP6.**  
**Nr.**

We ARMO s.p.a., Via Rosa di Luxemburg, 1, 10093 Collegno (TO) declares under our full responsibility, that the machinery mentioned above incorporates all needed safeties to avoid, for what it is possible, every risk, according to the following European Regulations:

- EN 1398:2009** European Regulation according to the adjustable dock levellers.
- EN ISO 12100** Safety of the machinery, basic concepts, general design principles.  
Part 1 : Basic terminology, methodology.  
Part 2 : Technical principles and specifications
- EN ISO 13857** Safety of the machinery: safety distances to avoid reaching risk areas with the upper limbs.
- EN 349** Safety of the machinery: minimum distances to avoid shearing of body parts.
- EN 414** Safety of the machinery: rules for draft or preparation of safety standards
- EN ISO 13850** Safety of the machinery: emergency stop devices: functional aspects
- EN ISO 13732-1** Safety of the machinery: temperature of the reachable surfaces
- EN ISO 13849-1** Part 1: safety of the machinery: parts of the control systems connected to the safety

General principles for the planning

- EN 982** Safety of the machinery: safety requirements according to the systems and their components for hydraulic transmissions.
- EN 60204** Part 1: safety of the machinery: electrical equipment of the machines, general principles
- EN 60529** Degrees of protection; protection of the electrical parts against contacts, foreign bodies and water
- EN 60947** Low voltage switches and control devices; part 4-1, electromechanical contactor Engine – starters
- HD 60364** Electrical installations; part 4; protection for safety; chapter 41; protection against electrical shocks; part 4; protection for safety; chapter 47; application of safety protection measurements;
- 2006/42/CE** Machines' regulations
- 2006/95/CE** Low tension Directives
- 2004/108/CE** EMC electro-magnetic compatibility directives

For no dated references it can be considered valid the last published edition at we refers to.

Collegno li, ..... (The sole administrator)

The conformity declaration signature permits to apply the CE mark.

Conformity Declaration, warranties, insurances and the responsibilities over the dock levellers forfeits immediately in case of disrespect of the prescriptions stated in the user's and instruction manual, with particular reference to the Maintenance and periodic check sections.



(+39)-011.71760.11



info@armoweb.com

15 – DT-325



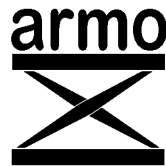
(+39)-011. 71760.19



http://www.armoweb.com



## WARRANTY CERTIFICATE



We declare that each single machine undergoes meticulous testing before being delivered . We guarantee therefore that each machine is free from defects when it leaves our warehouses.

### 1

All our machines are guaranteed 2 years. In case you think to benefit from the planned assistance, the warranty can be extended from 2 up to 5 years, understood that the planned assistance is in progress

### 2

All trade components used on our machines, as for instance control boxes and hydraulic power packs, are covered by own warranties provided by their manufacturers.

### 3

By warranty it is intended the complete cost-free replacement of the components found faulty from the beginning as a result of manufacturing faults.

**Transport freights and/or staff assignment are to be considered excluded.**

### 4

All parts resulting faulty due to negligence or careless use (lack of observation of the instructions for the functioning of the machine), wrong installation or maintenance not performed according to the user's and instruction manual, or performed by unauthorized persons, shipping damage, or in general all circumstances that cannot be in any case related to manufacturing defects, are not covered by this warranty.

### 5

The manufacturer declines all responsibilities for damages that could, directly or indirectly, result to persons, things or animals, as a consequence due to lack of observance of all directions given in this user's and instruction manual and concerning, in particular, all warnings regarding installation, use and maintenance of the machine.



## CIVIL LIABILITY POLICY FOR INDUSTRIAL FIRM



ARMO is insured against refund claims that are presented for damage caused to third parties by the products of the firm, after their shipment to the customers.

It includes: design faults, manufacturing faults, writing of the user's and instruction manual and packing defects.

It also includes all damage to the finished product (products, as components physically inseparable of other products) that causes damage to another component or to the final finished product.

Damages to manufactured articles partly built by the insured products.

Maximum for INSURANCE YEAR And SERIALY SINISTERS	€	2.500.000
Maximum per SINISTER	€	2.500.000
Faults limit due to TERMINATION OF BUSINESS	€	1.000.000