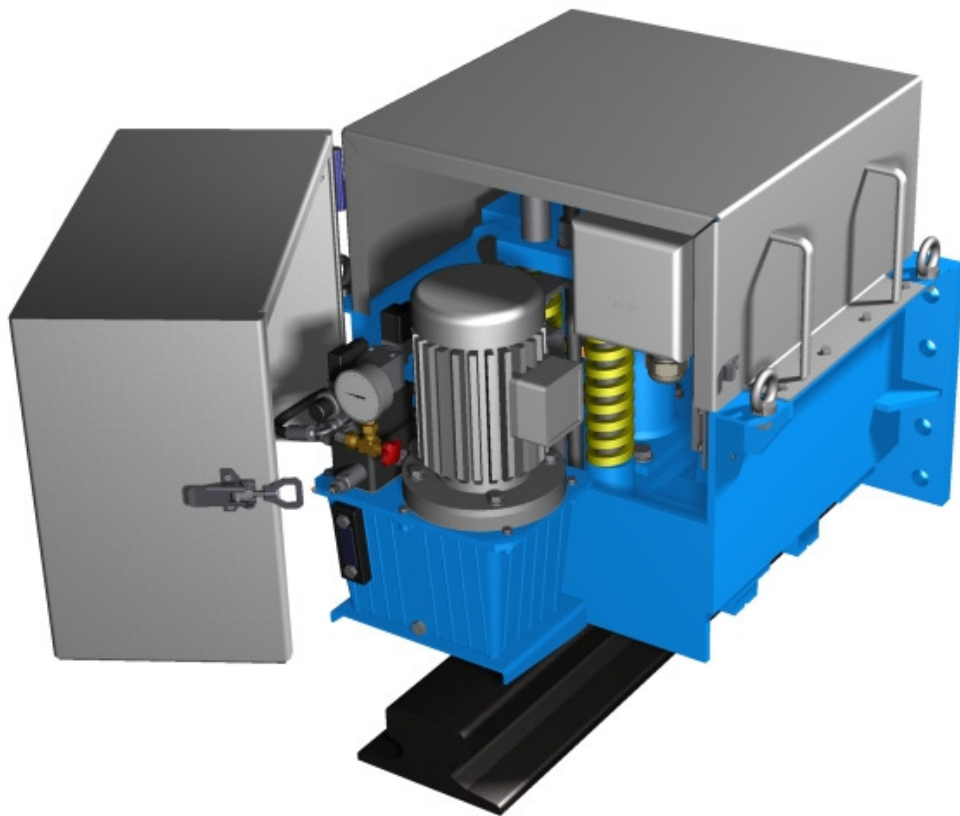


SPRING OPERATING SIDEWISE PRESSING RAIL CLAMPS

APRIL 2014

CATALOGUE "TM"

Rima S.r.l.
Via Fermi 255 – 21042 Caronno Pertusella (Va) Italy
Phone: +39 02 9650694 – Fax +39 02 9657860
E-mail: rima@rimagroup.com



WWW.RIMAGROUP.COM

DESCRIPTON

These rail clamps are storm brakes static suitable for small to medium forces: from 25 to 800 kN.

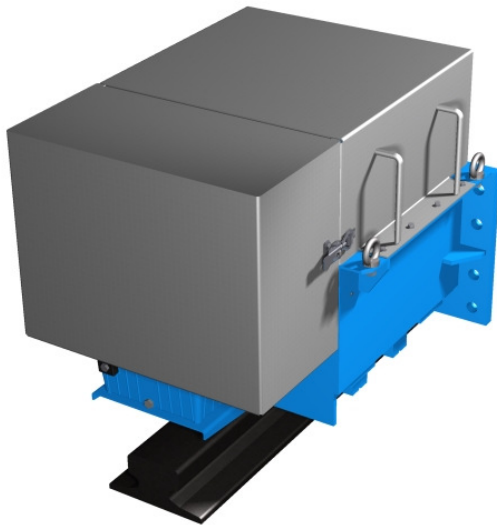
They are spring actuated; the spring exercise the closing force while an hydraulic cylinder fed by a suitable hydraulic unit provides the opening.

Special version of these clamps, suitable to dynamic application could be realized upon detailed punctual analysis, to be made through our technical department, to be contacted in case of need.

• *Technical features*

- Installation: side bolted;
- Vertical float = $\pm 7,5$ mm (to be checked upon rail type);
- Horizontal float = ± 30 mm;
- Tolerance respect to nominal width of the rail = $\pm 1,5$ mm;
- Opening time (signal for operation) = 4 seconds;
- Closing time = adjustable from 4 to 12 seconds.

On request these values can be modified.



Friction coefficient (TUV certified)

Braking pads at max allowable wear condition guarantee a friction coeff. of 1.0. Such value has been certified by TUV register in the several possible working conditions (like greased rail, etc. Braking pads have to be replaced when such wear condition is reached (relevant instruction are given in the operation and maintenance manual.

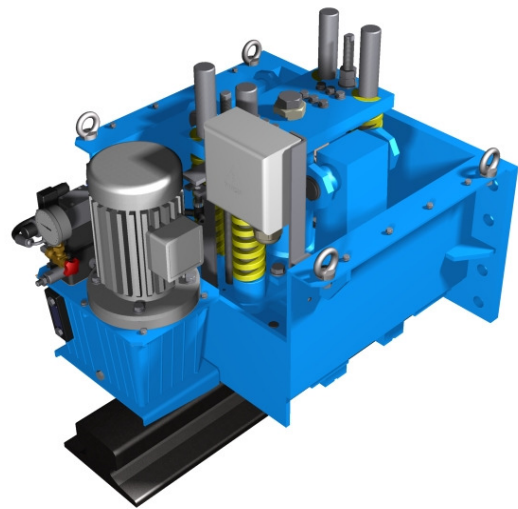
In certain countries, like for example Japan, and Australia, a friction coefficient of 0,25 is requested by law / local relevant standards.

The 0,25 value guarantees a high safety factor and very long life of braking shoes.

Upon request we can offer rail clamps with friction coefficient: 0,25.

Main European standards (DIN and FEM) are also foreseeing a friction coefficient value of 0,25 but allowing the use of higher value, provided this value to be well proven through test conducted in all possible working conditions.

To fulfil this requirement, our braking shoes are certified by TUV Register in several working condition like rail with grease, etc., both in case of new shoes and in case of shoes with max allowed wear.



UTILIZATION / FUNCTIONING

These rail clamps are to be considered as parking devices (safety against the movement caused by wind) and they work pressing on rail sides.

Each rail clamp is composed substantially of one steel frame, two rail guides and two jaws operated by springs trough suitable levers.

The rail guides are placed into the frame in such a way to follow side displacement between crane and rail.

The guides are constituted by plates properly shaped acting on side of the rail. In particular cases, rollers acting on the head sides of rail can be used.

As the braking shoes, through proper teeth, guarantee friction coeff. higher than 1.0, there is a high safety factor respect to the nominal catalogue performance where the friction factor computed is always lower .



Rima S.r.l.

Via Fermi 255 – 21042 Caronno Pertusella (Va) Italy

Phone: +39 02 9650694 – Fax +39 02 9657860

E-mail: rima@rimagroup.com

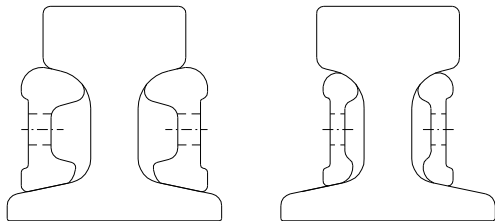
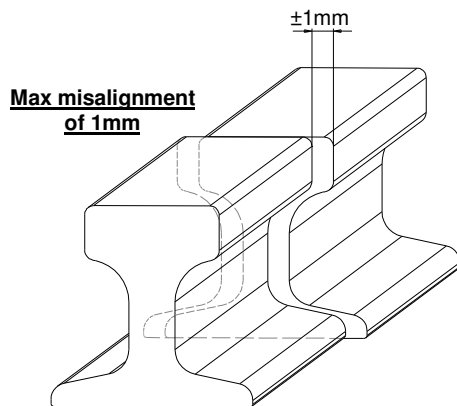
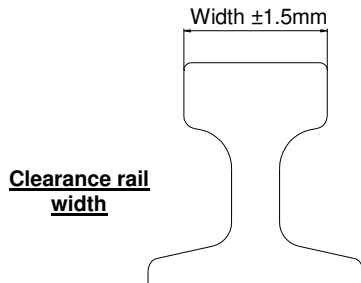


WWW.RIMAGROUP.COM

RAIL

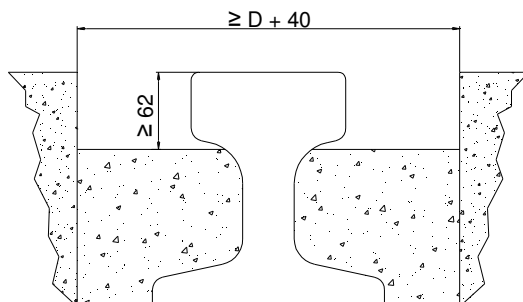
Braking shoes of our rail clamp have been designed to work on rails commonly on the market whose hardness is between 200 and 270 HB ($\sigma = 70$ to 90 daN/mm^2). The certification of TUV is referred to above given values of rail hardness.

In case of different values we must be informed at order, Because this could affect the rail clamp functioning.



In presence of this kind of rail joint, applicability has to be checked by Rima tech. dep.

Suitable for this kind of rail joint



Channel features

In the case what above shown cannot be respected, we have to be informed about effective conditions at offer stage.

OPERATING

• *Opening of Rail Clamps*

The pushing force given by the hydraulic cylinder under pressure opens the rail clamp. It is achieved by:

1. Starting the motor of the hydraulic unit by closing its remote control switch

Energizing the coil of electrovalve of the unit.

As the insertion of electrovalve stops the oil flow from the cylinder to the tank of the unit, the pump driven by the electric motor raises pressure into the cylinder which, with its movement, opens the rails clamps. During its opening, the cylinder through a suitable limit switch gives the signal of clamp open and allows the crane to run.

Then the pressure switch stops the motor pump group. Should small leakages cause a cylinder retraction, the pressure switch would restart the pump motor to restore original situation, avoiding the limit switch of crane travel to stop the crane.

• *Closure of Rail Clamps*

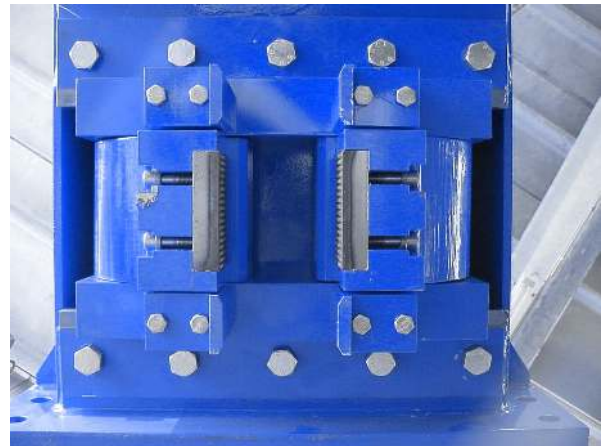
The closure of rail clamp is obtained by de-energizing the electro-valve.

In such way a passage between the cylinder and the tank is opened; the cylinder closes itself under the action of springs.

The closure is controlled through a flow control valve that gives the delay necessary to allow the stop of the crane by the drives / service brakes.

Opening time: approx. 4s

Complete delay: adjustable from 4s to 12s



COMPOSITION

• *Rail clamp (TM-01)*

Each rail clamp is composed of:

- Steel framework
- Steel levers
- braking shoes quenched and tempered
- Pins



Rima S.r.l.
Via Fermi 255 – 21042 Caronno Pertusella (Va) Italy
Phone: +39 02 9650694 – Fax +39 02 9657860
E-mail: rima@rimagroup.com



WWW.RIMAGROUP.COM

- Cylinder for rail clamps opening
- Spring providing the closing force
- Inductive limit switch which indicates "rail clamps open" and allows the gantry crane travel.
- Rail clamp and hydraulic unit covers are in stainless steel AISI316.

• Hydraulic Unit (SCI-TM-01)

It is suitable for sea-environment, completely assembled, wired, oil filled and flushed (acc. NAS 9). Cover in carbon steel with hinged door. All the electrical components are wired, to an electrical terminal box (protection IP 55)

• Emergency manual opening device

The rail clamps are supplied with suitable tie-rods complete with nuts. Acting on the nuts with a common key tool it is possible to open the rail clamps in case of emergency (lack of tension or hydraulic unit broken).

• Standard painting (only frame and external parts)

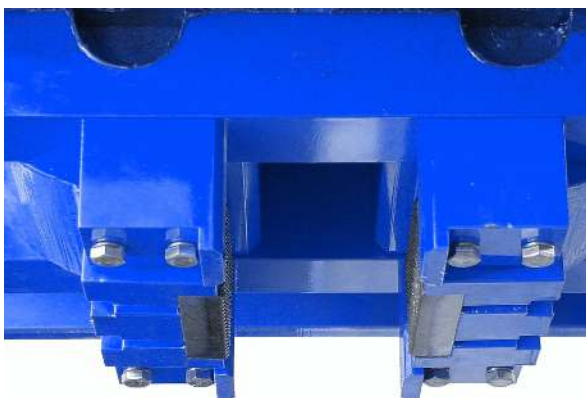
Total thickness : 240 micron.

- Surfaces preparation: Sandblasting SA 2 ½.
- 1° Coat: Moist curing inorganic two-component zinc primer. Consists on complex ethyle silicate and zinc dust in high rate (>86% in dry film).
Thickness = 80 micron
- 2° Coat: Two-component epoxy-polyamide primer and undercoat with zinc phosphate and micaceous iron oxide.
Thickness = 90 micron
- 3° Coat: Two-component aliphatic acryl-urethane based paint no yellowing. Re-coatable for long time.
Thickness = 70 micron

Final colour: Standard RIMA RAL 5019.

• Fluids for normal temperatures

Hydraulic oil: HLP ISO VG 15
Grease: SKF LGLT2



ELECTRIC CONTROL UNIT

It is usually foreseen by the crane manufacturer by means of relays or PLC. On request, it can be supplied on plate or in a box (IP 55).

Here after is illustrated the scheme we suggest (SCE-TM-01), which foresees the use of a suitable temporised relay. This relay is necessary to signal possible malfunctions in the hydraulic unit (for ex. oil deficiency or breakages of some hydraulic or electric components). Through this solution, temperature and level switches are not needed.

The logic control of the rail clamps closing is established by the customer.

The rail clamps are usually closed at the end of the crane work, or on signal of a suitable anemometer which signals that the wind speed is higher than the max. allowed speed.

The signal of closure of the rail clamp can be put under a timer to achieve an adjustable electric delay (in addition to the delay hydraulic).

As the electrovalve has to be always excited, the magnet must be in direct current; if the customer wants to feed the coil valve with alternated current, a suitable rectifier it is supplied.

WARRANTY

12/18 months

Warranty is subject to the following conditions:

- The electric diagram is made accordingly to the scheme we suggest (SCE-TM-01) or is made accordingly to a scheme designed by client but in any case approved by us.
- All maintenance procedures described in the manual provided with the supply are observed. In particular must be strictly observed the rules relevant to cleanliness and filters replacement.

In case one or more of above conditions should not be respected, the guarantee will be considered not valid.

TESTING

All rail-clamps are tested on a test bench before delivery, at a nominal force power.

Rima S.r.l.

Via Fermi 255 – 21042 Caronno Pertusella (Va) Italy

Phone: +39 02 9650694 – Fax +39 02 9657860

E-mail: rima@rimagroup.com



WWW.RIMAGROUP.COM



DOCUMENTATION

The documentation is worded according to EG (89/392/EWG) and Euro- EN 292-1/2; 1991 D rules.

- Use and Maintenance Manual
- Execution according to rules
- Over all dimension drawings
- Hydraulic and electric schemes
- Suggested spare part list
- Test Certificate
- Material certificated (EN 10204-2.1) for all main parts.

Documentation in Italian or English on cd-rom.

EXECUTIONS

• *Normal execution*

- Working temperature: -20°, +40°
- Environment: marine
- Installation with side flange
- Hydraulic unit integrated in the clamp, filled with oil and provided with terminal box
- With limit switch that signals clamp open

• *Special execution (on request, with extra-price)*

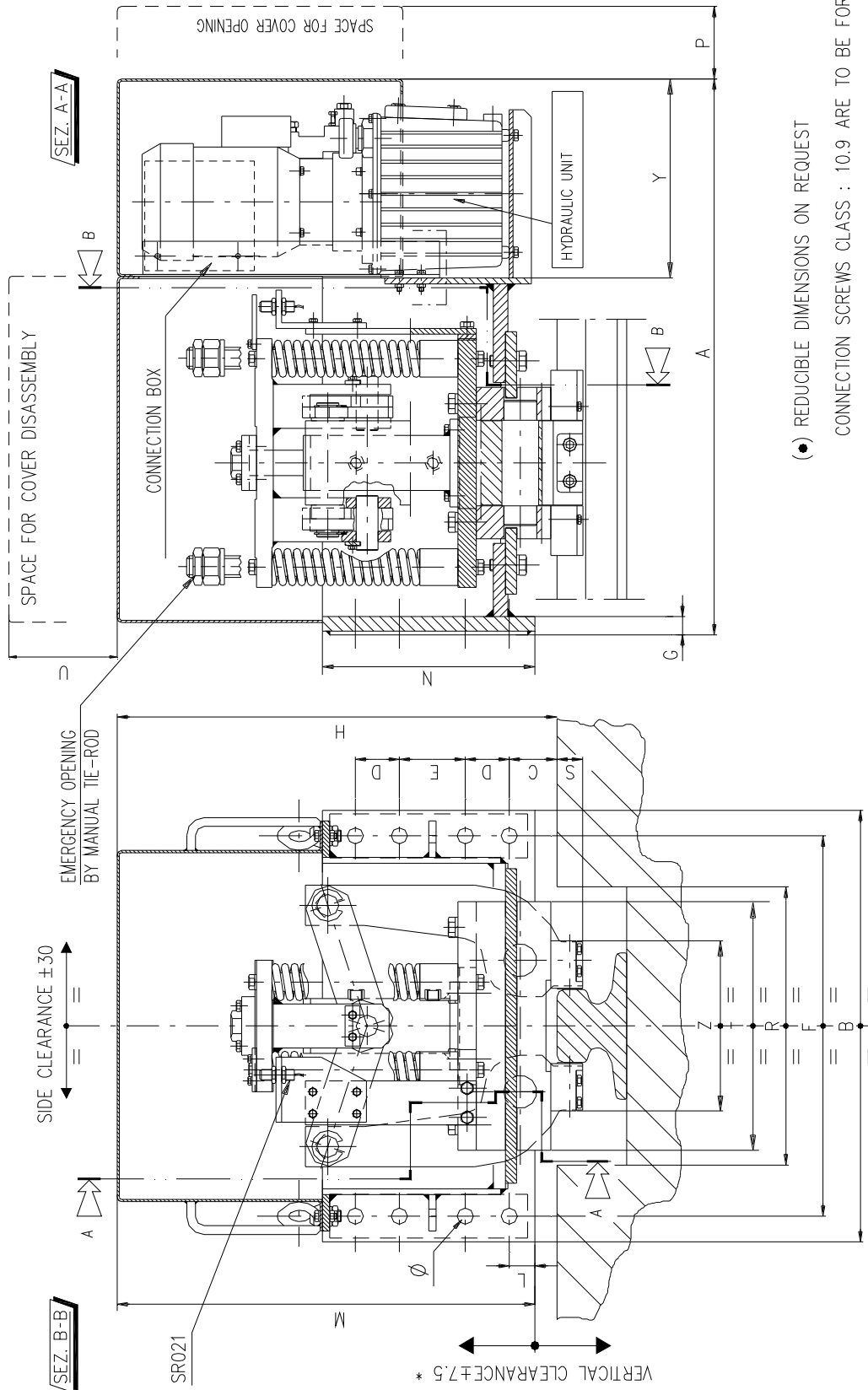
- Working temperature different from standard;
- Double side flanges or upper flange (with hydraulic unit supplied separately from rail clamps);
- Hydraulic unit suitable to operate with more rail clamps;
- Electrical board (on plate or box IP55);
- Limit switch which signals "rail clamps closed";
- Mechanical limit switch instead of inductive;
- Wider horizontal and vertical float;
- Security side stowage pins (to insert into suitable holes on the quay);
- Manufacturing according Q.C.P. different from our standard (Nuclear plan or special application);
- With special teeth for vertical force;
- For dynamic breaking;
- Language of documentation different from standard
- Certificates of materials (EN 10204-2.2, EN 10204-3.1 o EN 10204-3.2) for all main components;
- Suitable for fast crane with hard work cycles.



Rima S.r.l.

Via Fermi 255 – 21042 Caronno Pertusella (Va) Italy
 Phone: +39 02 9650694 – Fax +39 02 9657860
 E-mail: rima@rimagroup.com





(●) REDUCIBLE DIMENSIONS ON REQUEST

CONNECTION SCREWS CLASS : 10.9 ARE TO BE FORESEEN

*= IT DEPENDS ON THE TYPE OF RAIL

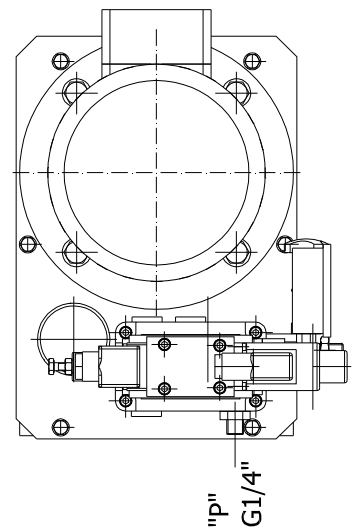
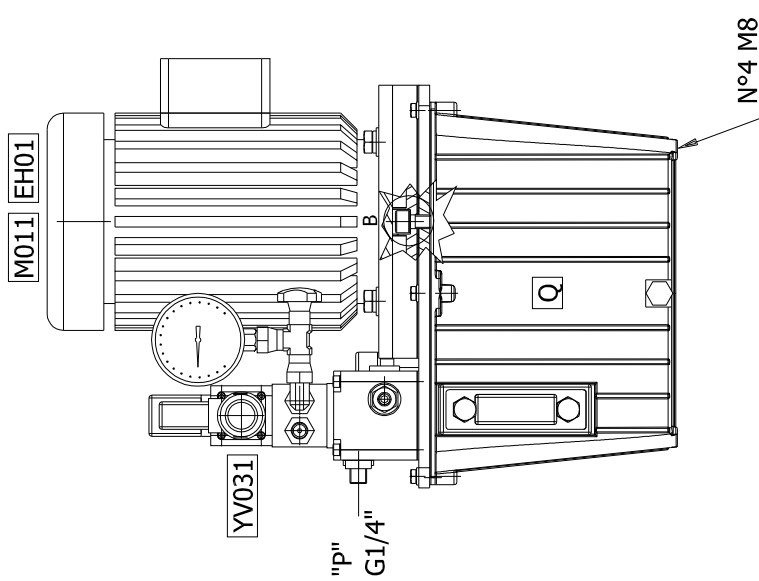
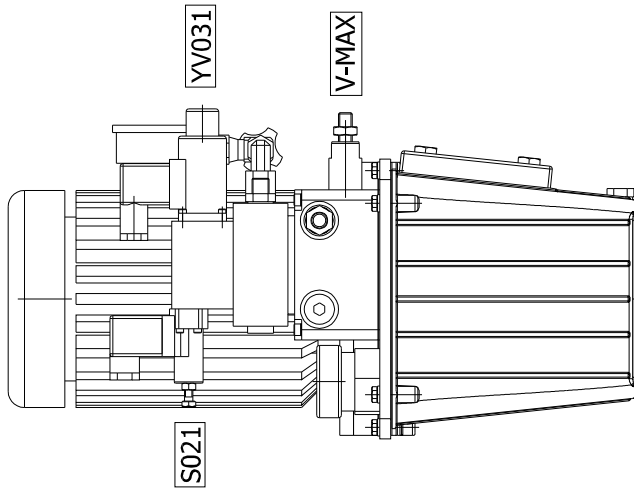
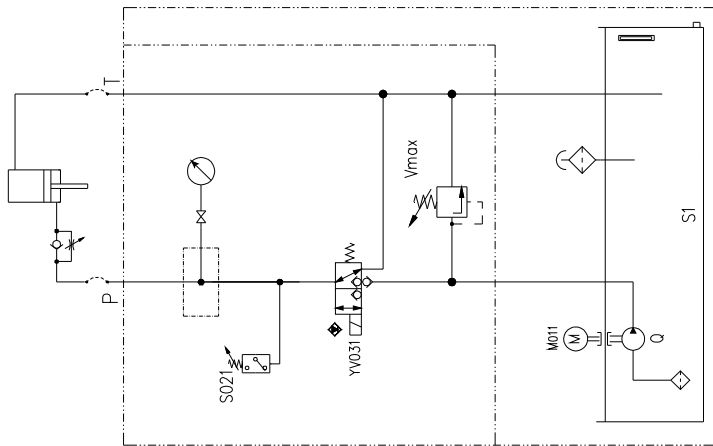
| CODE | BLOCKING POWER | A | B | C | D | E | F | G | H | L | M | N | P | R (●) | S (●) | T | U | Y | Z | φ | Mφ | PESO kg |
|------------|----------------|------|-----|-----|-----|-----|-----|----|-----|----|-----|-----|-----|-------|-------|-----|-----|-----|-----|----|-----|---------|
| TM11-200-A | 200 kN | 760 | 620 | 65 | 60 | 90 | 550 | 25 | 640 | 35 | 610 | 290 | 300 | 315 | 40 | 340 | 320 | 275 | 295 | 22 | M20 | 280 |
| TM21-400-A | 400 kN | 810 | 680 | 65 | 80 | 120 | 610 | 30 | 640 | 35 | 610 | 360 | 340 | 290 | 40 | 430 | 250 | 270 | 270 | 26 | M24 | 420 |
| TM31-600-A | 600 kN | 1000 | 810 | 90 | 90 | 150 | 720 | 35 | 730 | 50 | 690 | 440 | 420 | 345 | 40 | 490 | 250 | 280 | 325 | 33 | M30 | 730 |
| TM41-800-A | 800 kN | 1140 | 840 | 100 | 110 | 170 | 750 | 45 | 800 | 50 | 750 | 500 | 450 | 350 | 40 | 500 | 250 | 285 | 330 | 39 | M36 | 1130 |

FORCES AND DIMENSIONS INDICATED ARE REFERRED TO MAXIMUM HEAD WIDTH OF RAIL 120 mm. FOR RAIL WITH HEAD WIDTH GREATER THAN 120 mm PLEASE CONTACT OUR TECHNICAL OFFICE



Rima S.r.l.
 Via Fermi 255 - 21042 Caronno Pertusella (Va) Italy
 Phone: +39 02 9650694 - Fax +39 02 9657860
 E-mail: rima@rimagroup.com





SPECIFICATIONS ELECTROVALVE

YV031 *

24V DC - 30W

PRESSURE RELIEF VALVE

20 MPa

PRESSURE SWITCH

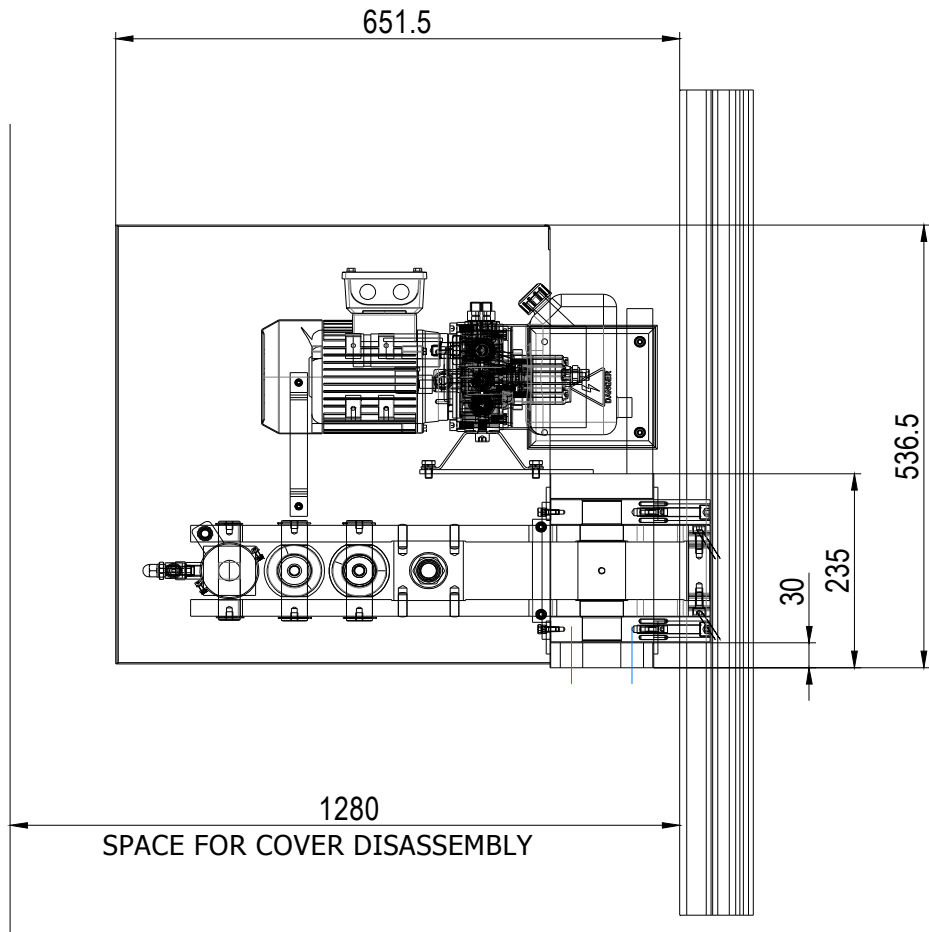
18 - 16 MPa

* = OTHER TENSIONS ON REQUEST

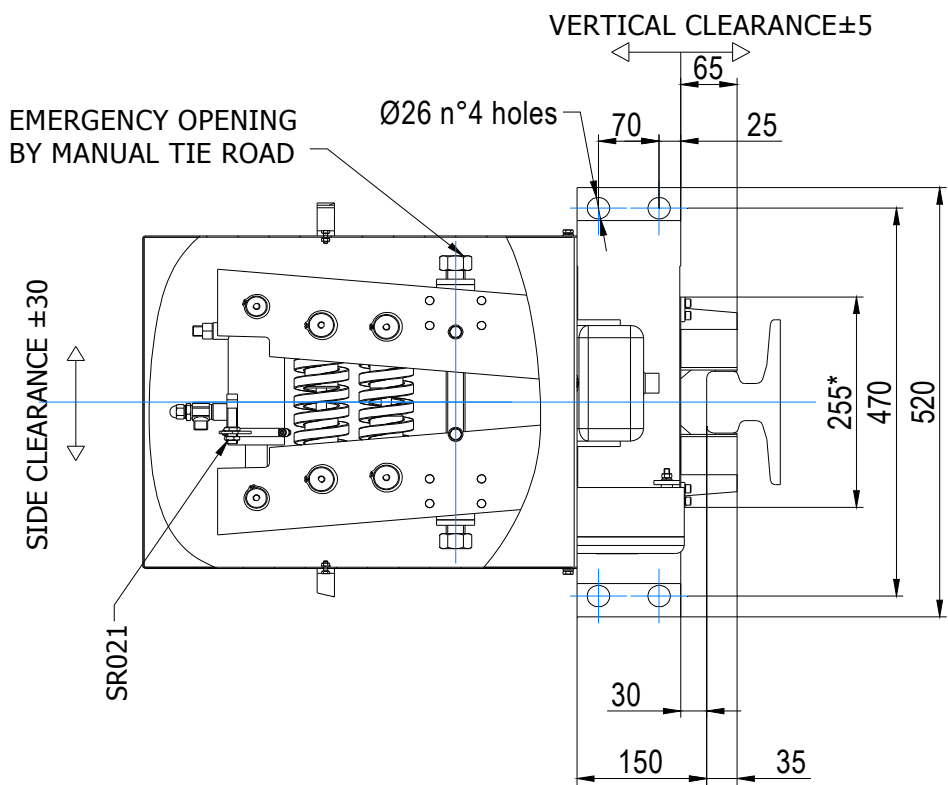
SCI-TM-01

| TYPE | RAIL CLAMP | SPECIFICATIONS MOTOR | GEAR PUMP | TANK |
|----------------|-------------------------------|----------------------|---------------|------|
| HYDRAULIC UNIT | | M011 * | Q | S1 |
| SCI-TM06-01 | TM11-200/TM21-400 TM31-600 | 0.75 kW / 400V-50Hz | Q = 2.4 l/min | 6 l |
| SCI-TM10-01 | TM41-800 | 1.5 kW / 400V-50Hz | Q = 5 l/min | 10 l |



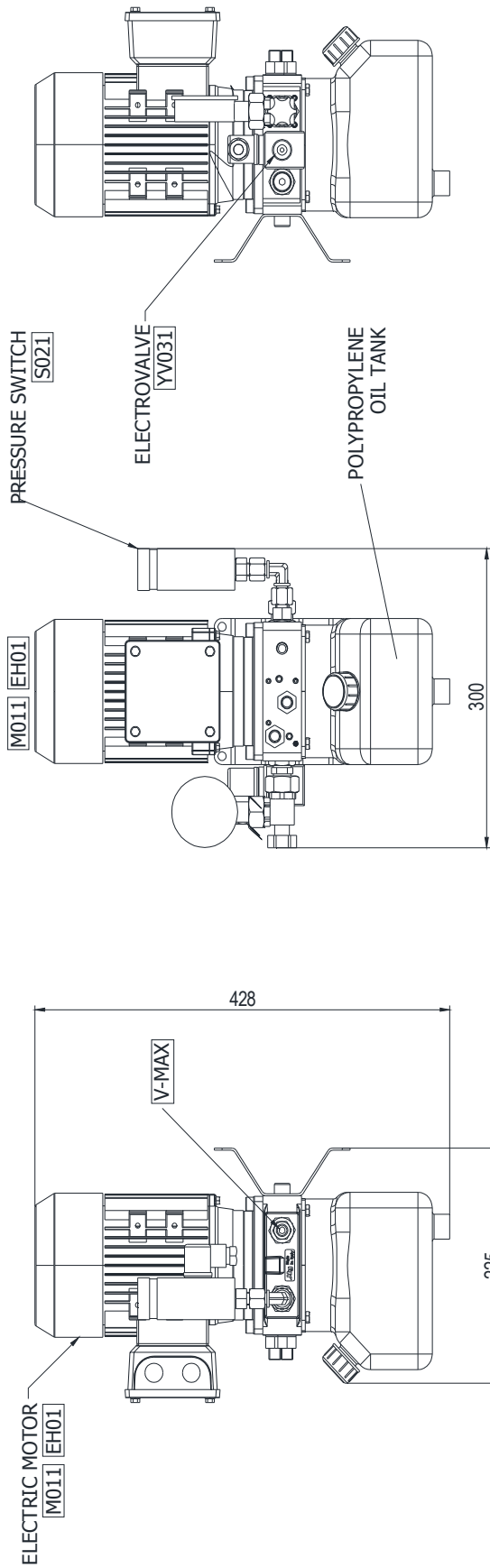


IT DEPENDS ON THE TYPE OF RAIL
CONNECTION SCREWS CLASS : 10.9 ARE TO BE FORESEEN



| CODE | BLOCKING POWER | WEIGHT |
|------------|----------------|--------|
| TM06-100-A | 100 kN | 135 kg |

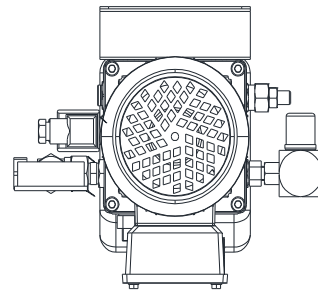
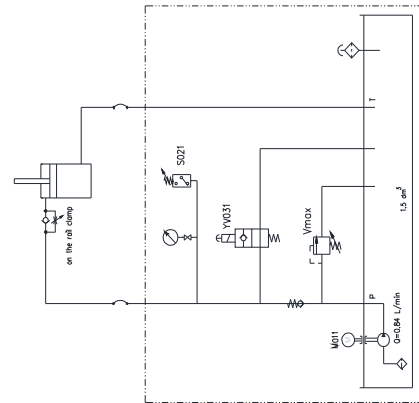




| |
|-------------------------------|
| SPECIFICATIONS ELECTROVALVE |
| YV031 * |
| 24V DC - 30W |
| PRESSURE RELIEF VALVE |
| 20 MPa |
| PRESSURE SWITCH |
| 18 - 16 MPa |
| * = OTHER TENSIONS ON REQUEST |

SH-TM-01

| TYPE | RAIL CLAMP | SPECIFICATIONS MOTOR | GEAR PUMP | TANK |
|----------------|------------|----------------------|----------------|------|
| HYDRAULIC UNIT | TM06-100 | M011 * | Q | S1 |
| SH-TM01-01 | | 0.37 kW / 400V-50Hz | Q = 0.84 l/min | 1.5l |





Technical Report Nr. IS 233638 EX SUM TR Rev.1

Customer: RIMA GROUP Srl - Via Enrico Fermi 255
21042 Caronno Pertusella
Varese

Subject: Braking pads for rail clamps and rail brakes

Site of Test: RIMA GROUP Srl - Via Enrico Fermi 255
21042 Caronno Pertusella
Varese

Date of test: 22/07/2013

Test Report: Technical Report Nr. IS 233638 TR Rev.1

Test description

The test is carried out by setting the braking shoes onto a test rail clamp installed on a test bench, applying a known pressing force on the rail sides of a rail and pushing the rail clamp with a measurable force parallel to the rail for 3 minutes.
Through these data is calculated the value of friction coefficient.
Two series of tests have been done, one with brand new braking shoes and one with braking shoes machined to reproduce the condition of max allowed wear.
Each series has been worked out with rail surfaces in two conditions (dry and greased).

Under the assumptions included in the full report IS 233638 TR Rev.1 the test result are summarized in the following Table 1:

| Characteristics of braking shoes teeth | Status of rail side surface | Friction Coeff. |
|--|-----------------------------|-----------------|
| New | Dry | 1.3 |
| New | Greased | 1.05 |
| Worn | Dry | 1.3 |
| Worn | Greased | 1.01 |

Sesto San Giovanni, 10/09/2013

Inspector TUO Italia S.r.l.
Ing. Giorgio Gennaro



Pag. 1 of 1