Rampway door 2-3 (B), Rampway door 3-6 (C), Front Door dk 6 (D), Rampway Door dk 12 (E)

General

The doors are located as shown in the arrangement plan. The doors, when open, allows vehicle traffic to access the designated decks

Construction

The door is constructed with flat top-plate, and open web construction

Means of operation

The door is arranged in one section hinged at the top. The operation is effected by direct acting hydraulic cylinders in the MCG Rack-Back system.

Initially the door is moved approximately 100 mm clear of the frame at an angle of 45 . When the hinge engages the correct position the door rotates to a final position of 5 above horizontal where it is secured.

Emergency operation

Emergency operation is included by means of a portable hand pump unit for releasing securing devices / lockings and lifting lugs on the door for operation by external means

Securing

In the closed and open positions securing of the door is by means of hydraulically operated cleat bolts located in the door.

In the closed position the sides and base of the door are additionally secured by fixed wedges which engage automatically as the door closes.

General features for all equipment

Degree of seal tightness

Weathertight

- A closing appliance is considered weathertight if it is watertight in any sea conditions.
- Generally, all openings in the free board deck and in enclosed superstructures are provided with weathertight closing appliances.

Watertight

- A closing appliance is considered watertight if it is designed be watertight in either direction under a head of water for which the surrounding structure is designed.
- Generally, all openings below the free board deck in the outer shell /envelope (and in main bulkheads) are fitted with permanent means of watertight closing.

Sealing system

Conventional

- MacGREGOR standard rubber packing is located where specified in conjunction with round nosed compression bars of stainless steel for weather exposed areas and ordinary steel elsewhere.

Sliding

- MacGREGOR standard sliding rubber packings are located where specified and compressed against a flat bar of stainless steel for weather exposed areas and ordinary steel elsewhere.

Weight

The specified weights include steel structure of the equipment, fittings, packings, hydraulic and electric components but exclude hydraulic oil. The weight is calculated net without margin for mill over-run and tolerances.

Hydraulic system

Main power pack

The main power pack supplies hydraulic oil under pressure in sufficient quantity to operate the MacGREGOR equipment within the time specified. The power pack consists of three electric motor driven closed loop pumps for Quarter Ramp operation and two electric motor driven pumps directing flow into a common output line.

In the event of failure of one motor/pump unit, the remaining functional motor/pump unit will still provide the capacity to operate equipment at reduced speed.

Hand pump unit

The portable handpump unit for emergency operation of cleats/lockings consists of:

- Tank, hand pump, 20 cm^3/stroke
- relief valve, 25 MPa
- hoses with fittings for connection to quick acting couplings

Cylinders

The cylinders are specifically designed for marine use and in accordance with Classification Society rules and MacGREGOR requirements.

Valves

The solenoids have manual over-ride facility to be able to be operated in case of an emergency.

Piping

Operating time

Defined as the time to raise/lower, open/close each item of equipment excluding the time required to release/engage the securing/locking devices.

Times stated are based upon:

- installed pipe work having dimensions according to MacGREGOR recommendations shown on the Hydraulic Block Diagram
- hydraulic oil type as specified
- ambient temperature +15 C deg.
- each item of equipment operated one at the time

Electric system

Motors

Motors are of marine type TEFC in accordance with the Classification Society rules.

Protection IP 55, Insulation class F

Motors are equipped with anti-condensation heating

Motor starters for main power pack

The starters contain the following features:

- main switch
- indicating lights for low oil level
- indicating light for high oil temperature
- remote start and stop.
- running light
- remote emergency stop
- running limiter (adjustable to 30 - 90 min.)
- control for anti condensation heater as specified in chapter 4.
- terminals for connection to automation system (IAS)

Control system

The control stations for operation are located near to the equipment, to provide a clear view of the equipment for the operator. All electrical equipment in the operating/control/indicating panels will be internally wired and connected to a terminal block.

Automated control system (controlled by a PLC-unit)

The operation are in a programmed sequence. In principle one push button for each operation, e.g. open/close..

Quarter ramp has additional functions for self-tension and quay sensors

Operating panels are equipped with the following:

- key switch
- one push button / lever for open/raise
- one push button / lever for close/lower
- switch for self-tensioning winches
- switch for quay sensor
- switch for start/stop of pumps
- indicating light, power on
- indicating light, pump running
- indicating light, securing devices bolts on/off

- indicating light, common alarm pump unit
- emergency stop
- lamp test

The control cabinet containing the PLC unit is equipped with the following:

- Main switch
- Indicating lights power on
- Indicating lights PLC running
- Indicating lights for PLC fault
- Lamp test
- Potential free contacts for output to the voyage data recorder (VDR)
- Indicating lights for input/output signals are fitted to the I/O modules

Limit switches

Proximity type limit switches for position indication of securing devices, cleats, equipment status, etc., are of magnetic type.

Audible and visible alarms

Amber flashing lamp and audible alarm are mounted on the ship's structure adjacent to the equipment and will operate whenever the equipment is moving.

Bridge indication

One bridge indication panel of mimic type, for indication of gastight and watertight equipment is provided, equipped as follows:

- indicating light of the equipment status i.e:
  - closed/secured - Green light
  - not closed - Red light
- indicating light for leakage detection on Stern ramp
- dimmer (for the green lights)
- lamp test
- a mode selection function "harbour/sea voyage" arranged so that an audible alarm is given if vessel leaves harbour with any shell door not closed or with any of the securing devices not in correct position.
- reset button for the audible alarm

Safety precautions for emergency operation

Read the following warning statements and notes before emergency operation of the equipment.

WARNING

Emergency operation may only be performed by authorized and fully trained personnel. If the emergency operation is performed incorrectly or not completed, safety is seriously endangered.
The officer in charge is responsible for emergency operation and must confirm when the ship is ready for normal operation.

Never release the locking devices for a raised or hoisted unit without checking that the unit is supported by intact hydraulic cylinders or other supporting devices.

CAUTION

If the equipment is emergency operated, the full sequence must be completed before it is allowed to proceed with normal operation.

Never let air enter the hydraulic system. If additional hoses or oil tanks are used, fill the housing with oil before operation and check that the oil tank has sufficient oil level.

NOTE

It is absolutely necessary to study the hydraulic diagram provided in this manual (usually provided in the CD version) before any emergency operation.

All emergency operation overrides every safety arrangement included in the system.

The indicating lamps may not be working (it may not be safe to trust their function when the control system fails), therefore it is necessary to have at least one observer at the location of operated equipment. The observer must be in direct contact with the operator. Use radio if it is not possible to communicate in any other way.

The emergency operating instructions are for guidance only and the full responsibility for the emergency operation must be taken by the officer in charge.

Legends and general information

Panel components

In the illustrations of the operating panel and control cabinets, the symbol shows the type of function for the component. Note the difference between the ordinary indicating lamp and the lamp push button. This legend is typical, showing symbols found on the panels.

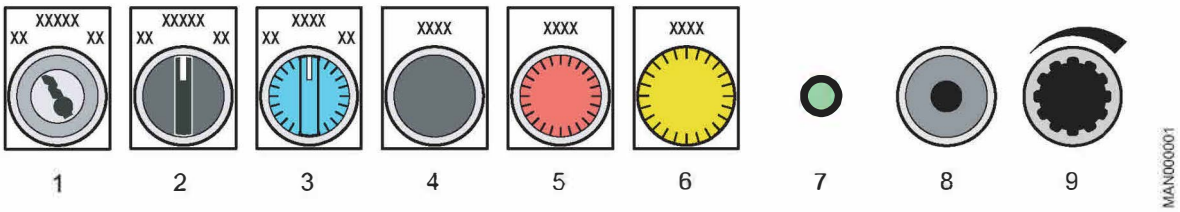


Figure 4-2 Typical panel components

1. Key switch
2. Selector switch
3. Illuminated selector switch
4. Push button
5. Illuminated push button
6. Indicating lamp
7. LED (Light Emitting Diode)
8. Buzzer
9. Dimmer

Symbols for panel components

All components on the panel are described in detail for each panel.

LAMP	Lamp or LED
PUSH BUTTON	Push button or emergency stop button
LAMP BUTTON	Push button with built in lamp or LED
SELECTOR	Selector with two or more positions, either locked in position or spring return
KEY SWITCH	Key actuated switch
JOYSTICK	Joystick or toggle switch

Common symbols

Sometimes general symbols are used to explain the functions of operating sequences. The legend is typical, showing symbols found in the sequence.

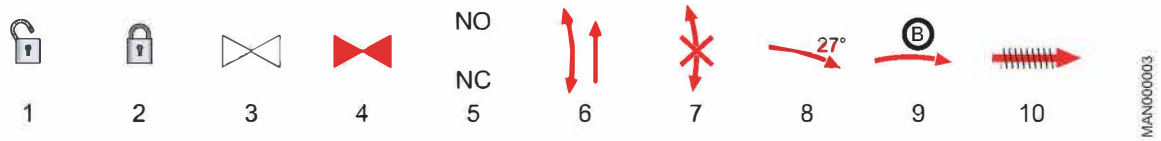


Figure 4-3 Common symbols

1. Unlocked or released
2. Locked or engaged
3. Open valve
4. Closed valve
5. NO = Normally Open, NC = Normally Closed
6. Moving direction
7. Movement blocked or floating off
8. Move until specific angle
9. Reference to the text, "Step (B)"
10. Object with spring return

Figures

Equipment and components are not always shown in correct scale or exact detail. Some equipment is shown in a typical illustration. Details may vary from the installed equipment. Most figures are created in colour for better visibility in the CD version of the manual.

Colours

The colours of the figures do not always correspond to reality, some colours are chosen to increase the clarity of the functions.

Indicating lamps are shown with a colour close to reality.

LED`s with multi-colour function are shown with the most significant colour.

In the figures, cleating and securing devices are usually shown in yellow, to highlight the safety function.

Technical data

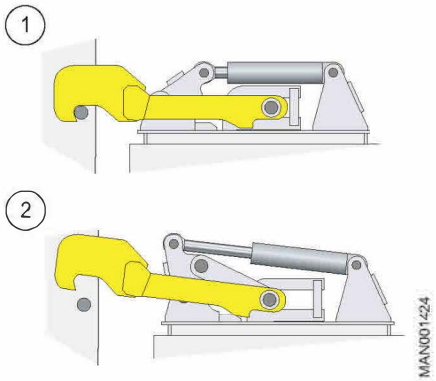
All angles and elevations are compared to horizontal level when the ship is on even keel if nothing else is mentioned.

For detailed technical data, see chapter 3.

Cleating devices

The following examples are typical.

Cleating hook

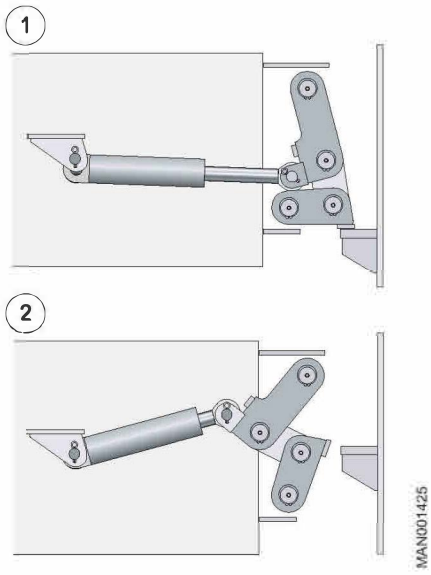


Equipment such as bow ramps and stern ramps are locked by cleating hooks. The cleating hook is of over centre type, and when pulled in, it must be released by oil pressure. Pulling the hook will mechanically increase the locking function.

1. Engaged
2. Released

Figure 4-4 Cleating hook

Over centre cleat



Equipment such as ramp covers are often locked by over centre cleats.

Emergency operation can be performed by using a hand pump.

1. Engaged
2. Released

Figure 4-5 Over centre cleat

Electrically operated securing bolt

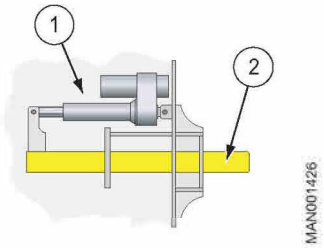


Figure 4-6 Electrical bolt

This electrically operated bolt is used when there is no need of axial force on the bolt. For example securing a ramp in a specific position.

The motor must be disconnected from the securing bolt before emergency operation.

1. Motor
2. Bolt

General rules for emergency operation

WARNING

When the equipment is emergency operated from the valve station, the officer in charge must have a clear view of the moving equipment and have continuous radio contact with the person at the valve station.

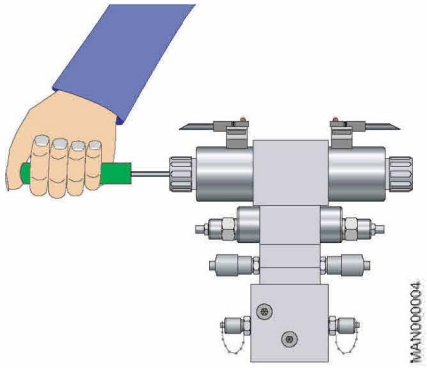


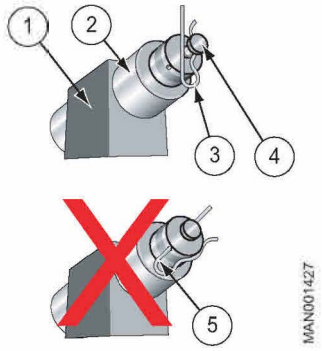
Figure 4-7 Manual actuating

If the hydraulic power pack is working and the hydraulic circuits are intact, it is possible to emergency operate the unit.

Use a screw driver or similar tool to push the valve spool. Be careful no to damage the spool.

Emergency actuator (optional)

The emergency actuators can be fitted on the solenoid valves for easy operation by hand. The push button can for some types be locked in both actuated and free position.



1. Solenoid valve
2. Emergency operator
3. Safety clip locked in inactive position
4. Push button
5. Safety clip locked in active position.

Absolutely forbidden!

Figure 4-8 Emergency actuator

WARNING

The emergency actuators must be removed from the solenoid valves after operation. If the push button is locked in actuated position and the pump starts, the equipment can cause mortal injuries.

Symbols for emergency operation of solenoid valves

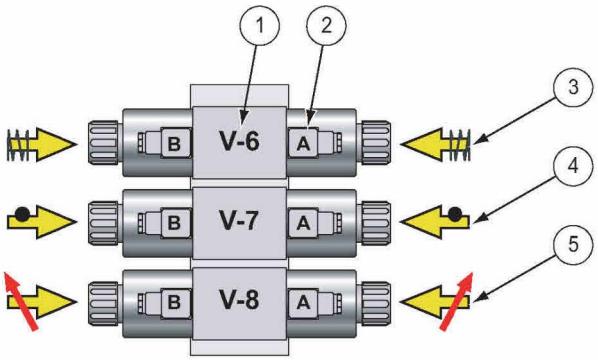


Figure 4-9 Legend for emergency operation symbols

1. Valve identification.
2. Coil identification.
3. Spring return. Spool returns to neutral position when released.
4. Detent function. Spool remains in selected position when released.
5. Proportional function. Variable oil flow depending on the force on the spool. Spool returns to neutral position when released.

Table for emergency operation

The procedure for emergency operation is described in a table.

In this example, first valve VX02 coil A and VX01 coil B are operated simultaneously until the cleating hooks are released. After this operation, check the result visually. Then valve VX02 coil A is operated.

Step	Operate	Unit	Direction	Result, remarks
1	VX02 B VX01 A	Main operation locking	Cleating hooks off	Until cleating hooks released
2	VX02 A	Door	Open	Until door is open

Keep the valve for securing or cleating actuated during the operation of main cylinders in order to keep the cleats in released position.

Rampway door 2-3 (B), Rampway door 3-6 (C), Front door dk 6 (D), Rampway door dk 12 (E)

The rampway door and front door is also mentioned as “door” in the operating instructions.

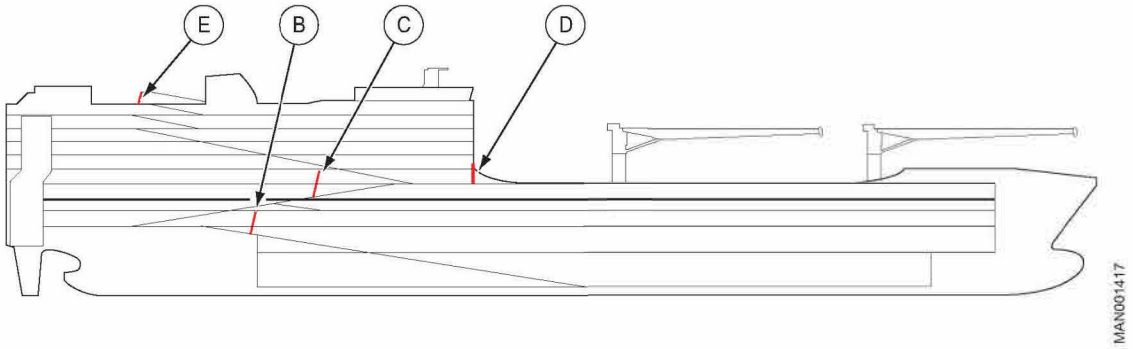


Figure 4-29 Location of doors

Description

The doors are located as shown in the arrangement plan. The doors, when open, allows vehicle traffic to access the designated decks

Means of operation

The door is arranged in one section hinged at the top. The operation is effected by direct acting hydraulic cylinders

Securing

In the closed and open positions securing of the door is by means of hydraulically operated cleat bolts located in the door.

In the closed position the sides and base of the door are additionally secured by fixed wedges which engage automatically as the door closes.

Emergency operation

Emergency operation is included by means of a portable hand pump unit for releasing securing devices / lockings and lifting lugs on the door for operation by external means

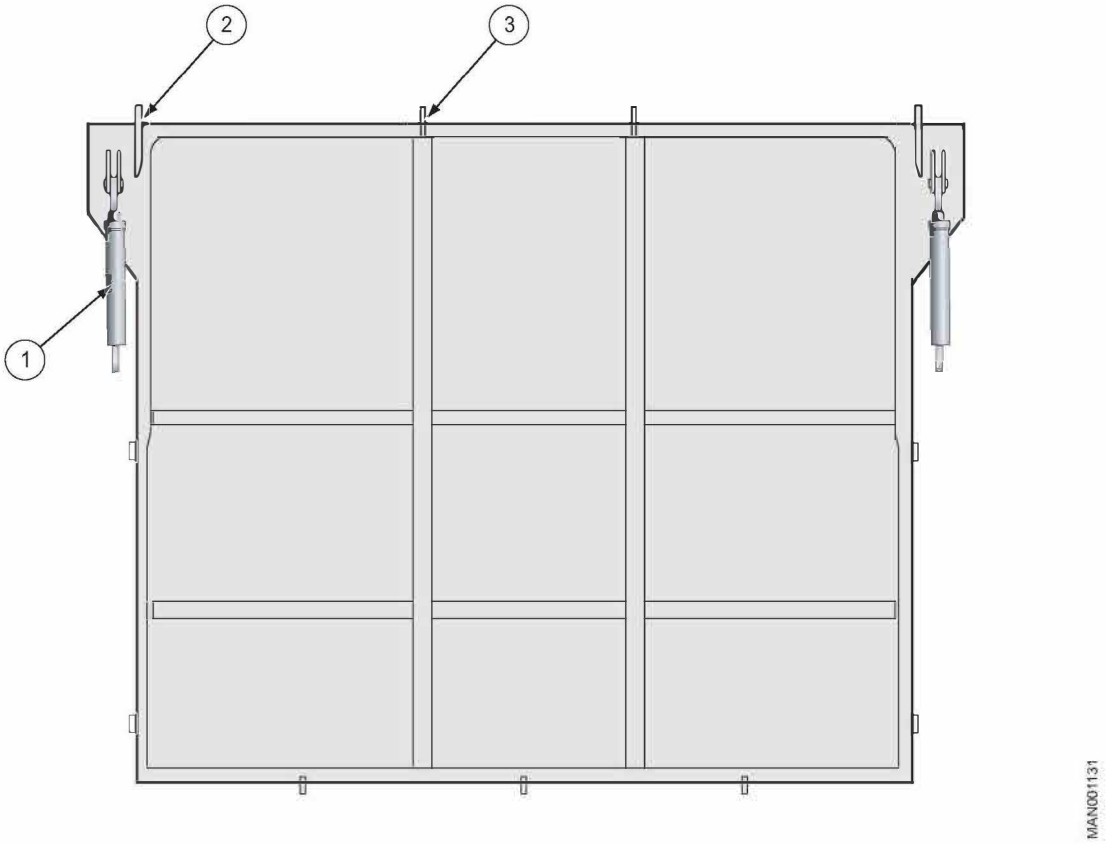


Figure 4-30 Door, typical

1. Main operating cylinder
2. Main hinge
3. Support hinge

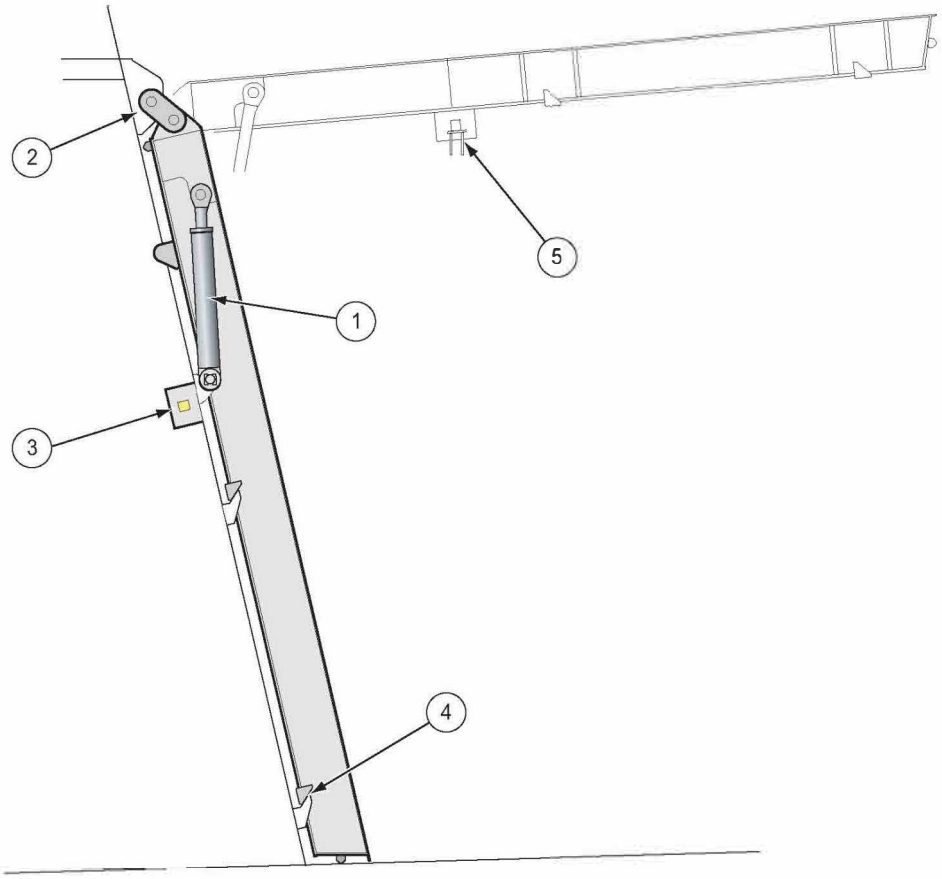


Figure 4-31 Door section, typical

1. Main operating cylinder
2. Hinge
3. Locking bolt
4. Fixed wedge
5. Support open position

Operation panel

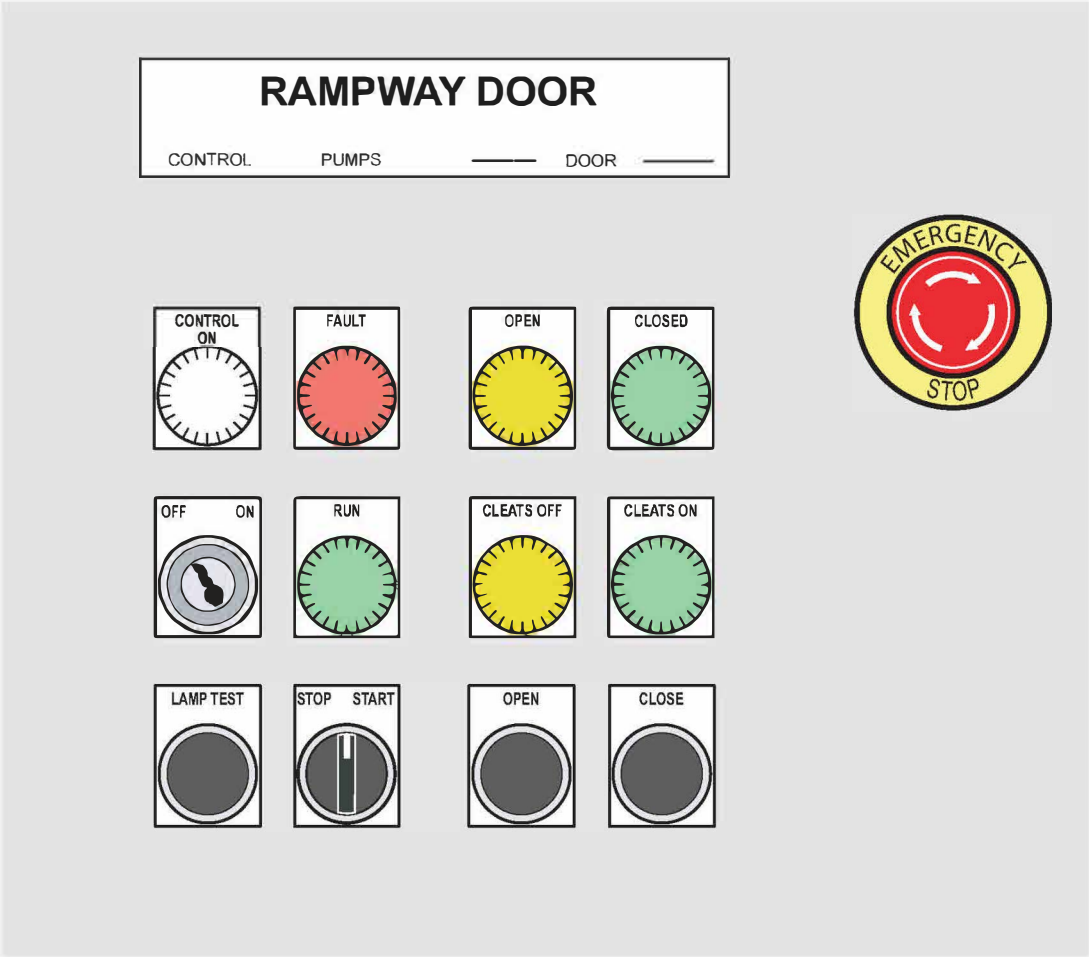


Figure 4-32 Operating panel for door, typical

CONTROL

☼ CONTROL ON	Operating is enabled
⚷ ON OFF	Key switch to activate the operating panel
❍ LAMP TEST	Testing of all lamps on the operating panel

PUMPS

☼ FAULT	Alarm from motor starter
☼ RUN	Pumps are running
¹ø² STOP START	Stops and starts the pumps

DOOR

☼ OPEN	Door is open
☼ CLEATS OFF	Cleats released
❍ OPEN	Press to open door
☼ CLOSED	Door is closed
☼ CLEATS ON	Cleats engaged
❍ CLOSE	Press to close door
❍ EMERGENCY STOP	Stops pumps and all operations

Operation of front door

WARNING
Read "Safety precautions for operation" on page 4-3 before any operation.

Operating

Before operation, turn key switch CONTROL to ON.

Press LAMP TEST to check that all indicating lamps are working.

Start pumps before operation and stop them afterwards.

Opening

1. Press button OPEN until door is fully open and panel lamps CLEATS ON and OPEN lights

Closing

1. Press button CLOSE until door is fully closed and panel lamps CLOSED and CLEATS ON lights

Emergency operation

Emergency operation is included by means of a portable pump unit for releasing securing devices and lockings.

WARNING
Read "Safety precautions for emergency operation" on page 4-4 before any emergency operation.

If the hydraulic power pack is working and the hydraulic circuits are intact, it is possible to emergency operate the unit by actuating the solenoid valves with a tool, see "General rules for emergency operation" on page 4-10.

Emergency operation from hydraulic valves

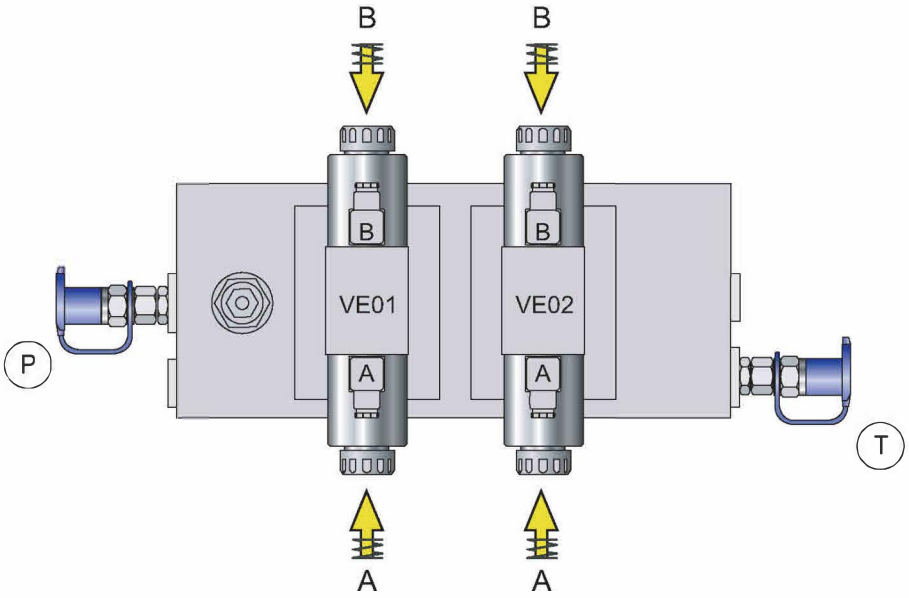


Figure 4-33 Emergency actuating valves rampway door

Vx 01 A Door cleats, on
Vx 01 B Door cleats, off
Vx 02 A Main operation, open
Vx 02 B Main operation, close

Emergency operation of door

- Start pumps
- Press solenoid valves according to the table

Opening door

Step	Operate	Unit	Direction	Result, remarks
1	Vx 02 B	Main operation	Close	To release pressure on cleats and lockings
2	Vx 01 B	Door cleats	Off	Until all cleats and lockings are released.
3	Vx 02 A	Main operation	Open	Until door is fully open
4	Vx 01 A	Door cleats	On	Until all cleats and lockings are engaged

Closing door

Step	Operate	Unit	Direction	Result, remarks
1	Vx 02 A	Main operation	Open	To release pressure on securing wedges
2	Vx 01 B	Door cleats	Off	Until all cleats and lockings are released. **Visual check of cleat position before main operation**
3	Vx 02 B	Main operation	Close	Until door is completly closed
4	Vx 01 A	Door cleats	On	Until all cleats and lockings are engaged

- Stop the pump if no other equipment is to be operated.

Bridge Panel

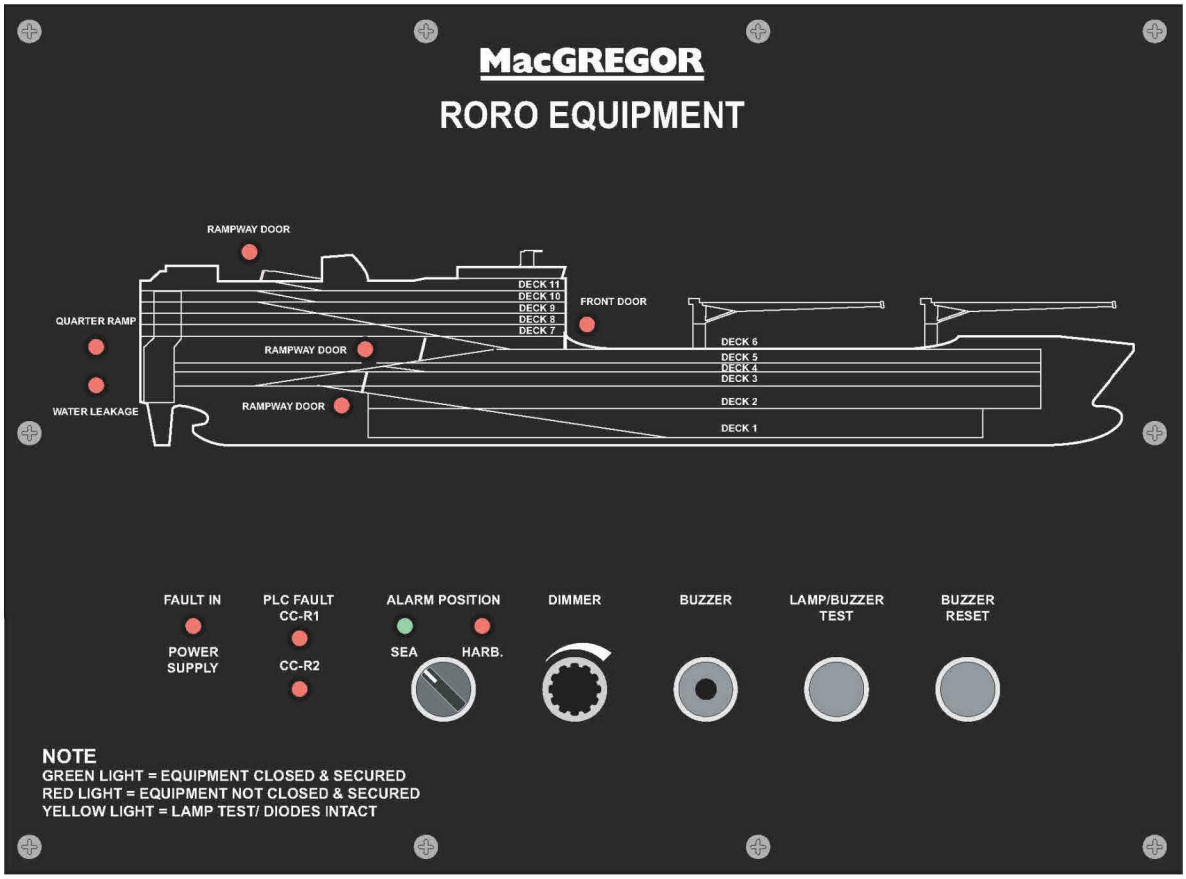


Figure 4-16 Bridge Panel

The bridge panel shows the status of the ramps and doors. If a ramp or door is not closed and cleated, the corresponding red lamp is on.The Bridge Panel is supplied with 24V DC power from the ship emergency supply with backup battery.

Sea - Harbour switch

Before the ship leaves the harbour, the safety switch must be in position SEA.
In sea-mode the possibility to operate any solenoid valve is disabled.
When the equipment shall be operated, the ALARM POSITION (= alarm mode) switch must be in position HARBOUR to avoid false alarms.

Green light

Green light indicates that the unit is correctly closed and secured. It also indicates that the control systems are intact and working.

In order to get the green indication, all of the following conditions are required.

- All limit switches for closed and cleated equipment are actuated.
- Cables to limit switches are intact.
- The control system has power.

- The relays for indication signals are actuated.

Red light

Red light indicates that the equipment is not closed or not secured. If a red light turns on during a sea voyage, the actual equipment must be checked immediately.

Dimmer

The dimmer allows the user to adjust the green lamps only.

Buzzer

When the safety switch is in position SEA, the buzzer sounds if any equipment is indicated as not closed or not secured.

The buzzer sounds if the fuse for the panel blows.

The buzzer is disabled in harbour mode.

Reset

Pressing the reset button ACKNOWLEDGE ALARM turns off the buzzer sound. If a new alarm occurs, the buzzer sound will restart.

Lamp test

The indicating lamps for the equipment shall change to *yellow* light, if intact, when pressing LAMP / BUZZER TEST

Lamps on Bridge Panel

FAULT IN POWER SUPPLY		The fuse for the Bridge Panel is blown.
PLC FAULT		Fault in the PLC units for the equipment. The Bridge Panel works safely even if a PLC fault is indicated.
ALARM POSITION	SEA	The Bridge Panel is in Sea Mode.
	HARB.	The Bridge Panel is in Harbour Mode.

The indicating lamp can show green or red light depending on if the equipment is closed and secured or not.

The text for the LED's doesn't need any explanation.

The indicating LED's show the actual status of each unit.

Green light indicates safe status, doors closed and locked.

Red light indicates that the unit is in unsafe position, not fully closed or cleated.