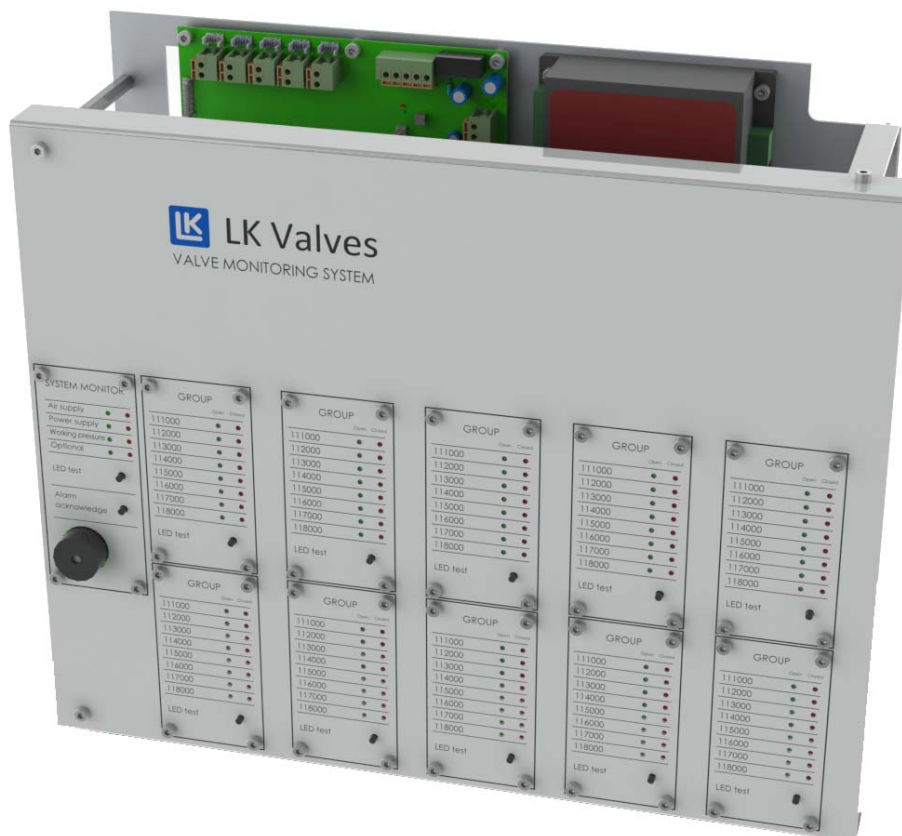


Valve Monitoring System

User manual



Contents

1. General information	4
1.1.Introduction.....	4
1.2 For your safety	4
1.3 Personal qualifications.....	4
1.4 Electrical connections	5
2. Standard VMS	6
2.1 System overview	6
2.2 System Monitor	8
2.3 Valve Monitor.....	8
2.4 System Card	9
2.5 Input Card	10
2.6 System alarm input	11
2.7 System alarm output.....	12
2.8 Connecting a limit switch	13
2.9 Connecting an inductive proximity switch.....	14
3. VMS with remote display	15
3.1 Remote display	15
2.2 Custom designed panels.....	17
3.3 Relay card	18
4. Starting up the system	20
5. Service and troubleshooting	21
5.1 Maintenance of UPS batteries.....	21
5.2 Troubleshooting	21
5.3 Parts list	22
6. Contacts	22

1. General information

1.1. Introduction

This manual contains important information for safe and appropriate assembly, operation and maintenance of the Valve Monitoring System (VMS).

Read these instructions thoroughly, especially chapter 1.2 and 1.3 before connecting and working with this equipment.

LK Valves offers a complete valve monitoring solution as an option to our pneumatic and hydraulic control stations. One Valve Monitoring System (VMS) can handle up to 160 signals from external limit switches or inductive proximity switches. The system has a built in Uninterruptible Power Supply (UPS) and an alarm indicating low air pressure, loss of electric power and a possibility to add 2 optional alarms. Everything is built on modules maximizing flexibility. This flexibility allows us to build a system exactly to your needs. The VMS can be mounted inside any of our control station cabinets or externally in a separate cabinet.



1.2 For your safety

General:

Keep these instructions in a location where they are accessible to all users at all times. Always include these instructions when you pass the VMS on to third parties.

Intended use:

The VMS system is only intended for industrial and professional applications. Note the stated limits to input AC voltages and auxiliary equipment.

Improper use:

LK Valves AB is not responsible on any part if this equipment is installed in an incorrect manner and if these instructions was not followed properly.

1.3 Personal qualifications

Assembly, disassembly and operation may only be carried out by a qualified electrician and personnel with documented knowledge in pneumatics/hydraulics. Qualified personnel must observe the rules relevant to the subject area.

1.4 Electrical connections

The built in power supply accepts nominal 100-240VAC (50-60Hz). We recommend the use of an external fuse, MCB or other type.

A protective earth conductor must be connected to the chassis, see below. If multicore wires are used the wires have to be terminated with ferrules. For the earth conductor a ring terminal is supplied accepting 1,5-2,5 mm² wire.

Use the supplied cable gland for mains power wire. It accepts round wire Ø 5-13mm. This ensures a secure fastening to the cabinet.



NB!

Before any work on or installation of the electrical components main power must be disconnected and the battery must also be disconnected! Otherwise the components can be seriously harmed!

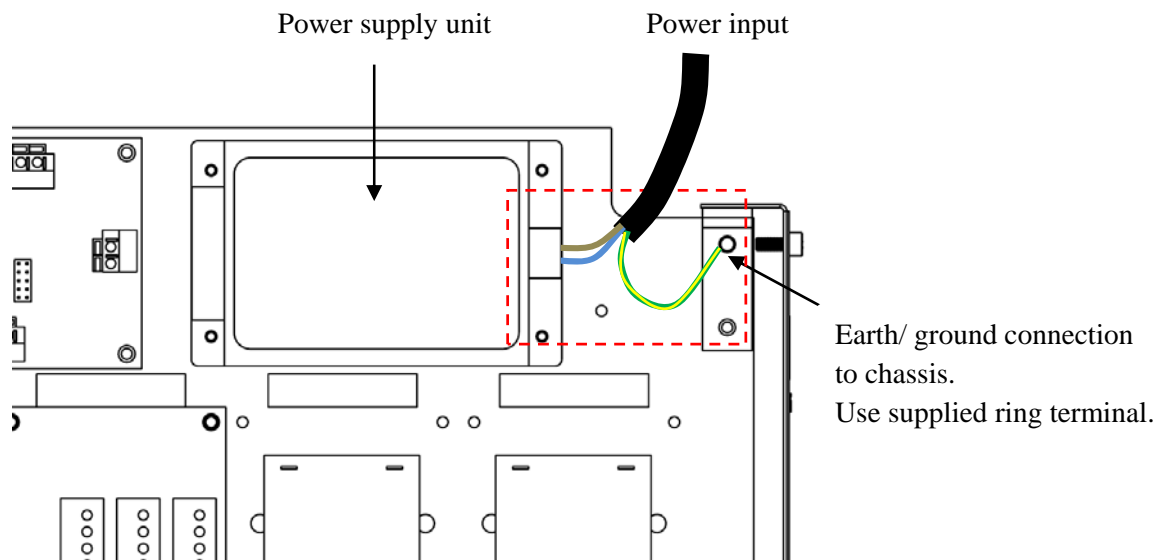


Dangerous voltage!

Danger to life due to short circuits and electric shocks caused by unsafe power supply isolations, improper grounding, and insufficient external fuse protection.

Connect the earth/ground according to illustration below.

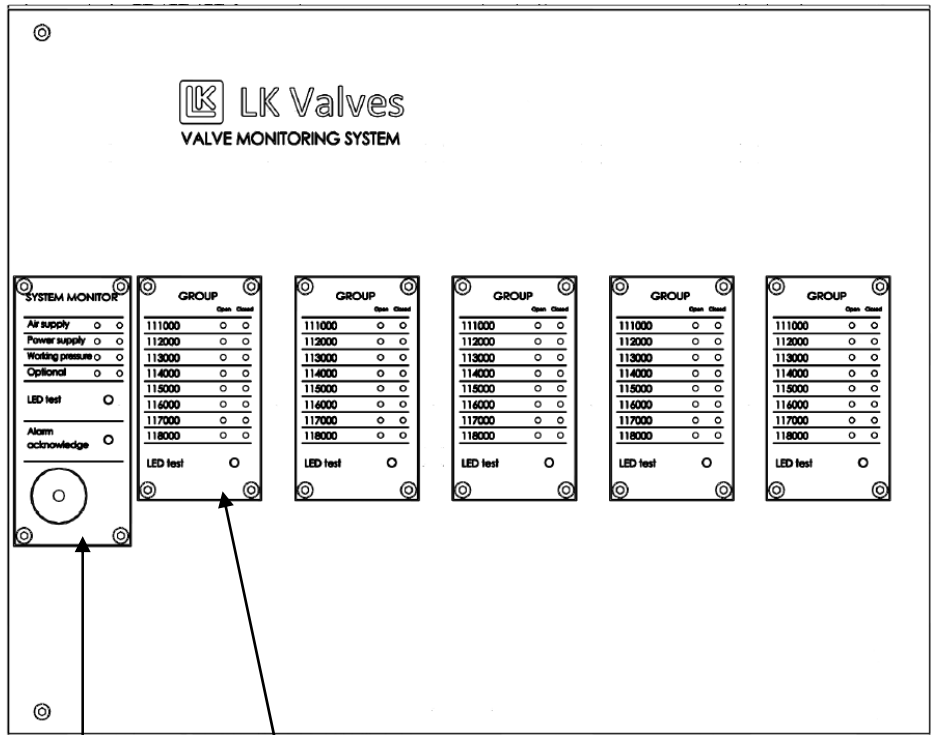
Never work on the power supply if power is applied.



2. Standard VMS

2.1 System overview

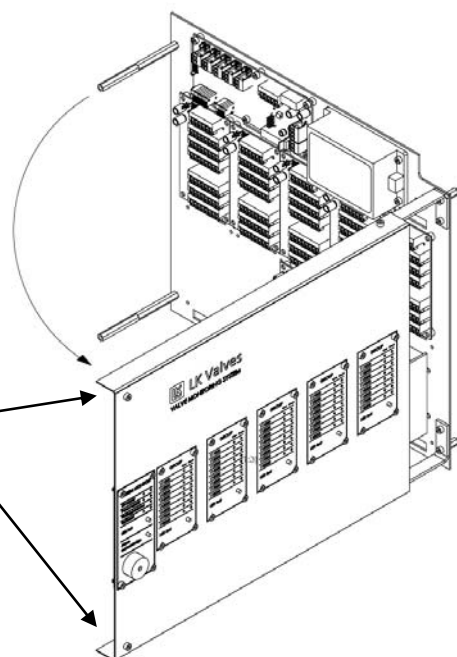
Front view of the Valve Monitoring System
(Illustration shows a VMS system with 5 groups)



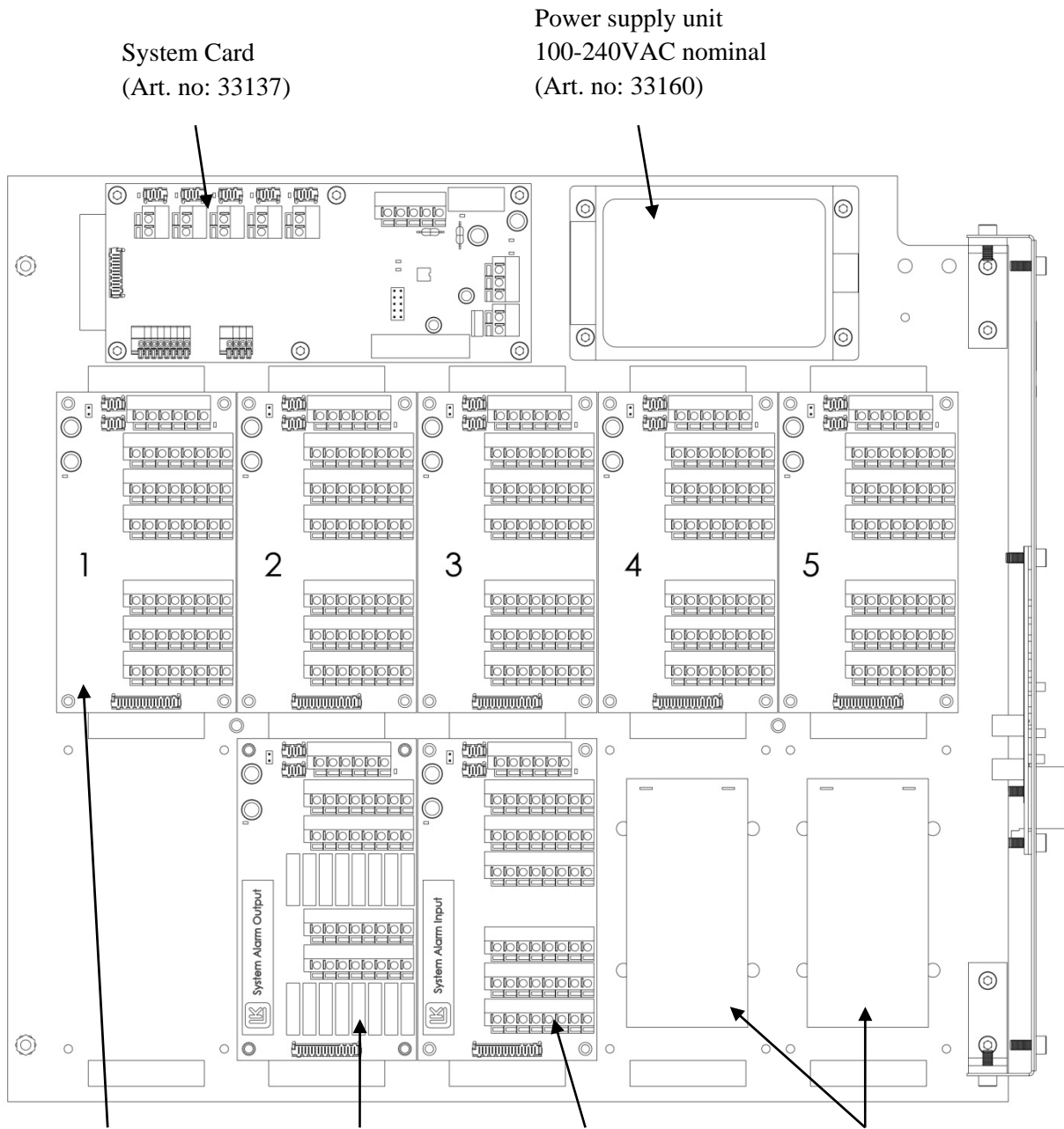
System Monitor
(Art no: 33135)

Valve Monitor (1-10 pcs)
(Art no: 33136)

Remove these screws
to open front panel.



Front view with open door



System Card
(Art. no: 33137)

Power supply unit
100-240VAC nominal
(Art. no: 33160)

Input Card (1-10pcs)
(Art. no: 33138)

Relay Card (1 pcs) for
system alarm output
(Art. No: 33144)

Input Card (1pcs) for
system alarm inputs.
(Art. no: 33138)

UPS Batteries
Panasonic LC-
R121R3P
12V 1,3Ah each
(Art. no: 33238)

2.2 System Monitor

The system monitor (33135) is connected to the System Card and indicates and alarms if a main system component fails. The following indications are available:

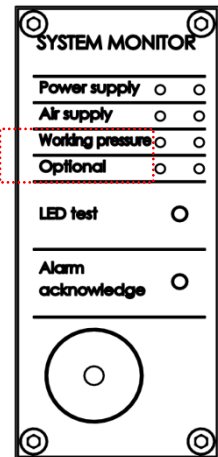
- Power supply (monitors main electric power)
- Air supply (monitors air vessel pressure)
- Working pressure (optional - monitors available working pressure)
- Optional alarm

Indication:

Ok – system component ok.

Fail – Fail signal is detected. This triggers the alarm to go off. The alarm consists as standard of a built in (90dB) alarm buzzer. A flashing alarm lamp and/or an external alarm buzzer are available as an option.

Customizable text



Functions:

LED test – a local test of all LED’s on the circuit board.

Alarm acknowledge – push this button to quiet the alarm when working or troubleshooting. When the fail alarm has been reset the alarm function is reset automatically.

2.3 Valve Monitor

Each Valve Monitor is connected to an individual Input Card which forms a group of input signals and display of these signals.

Each valve monitor (33136) can indicate up to 16 individual signals (8 open/8 closed signals). The customizable front panel shows only the active LED rows. This makes it intuitive and easy to see displayed information

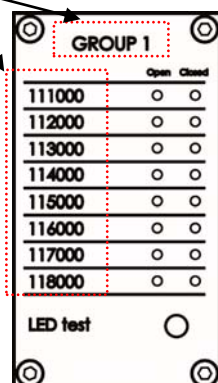
Indication:

Open
Closed

Functions:

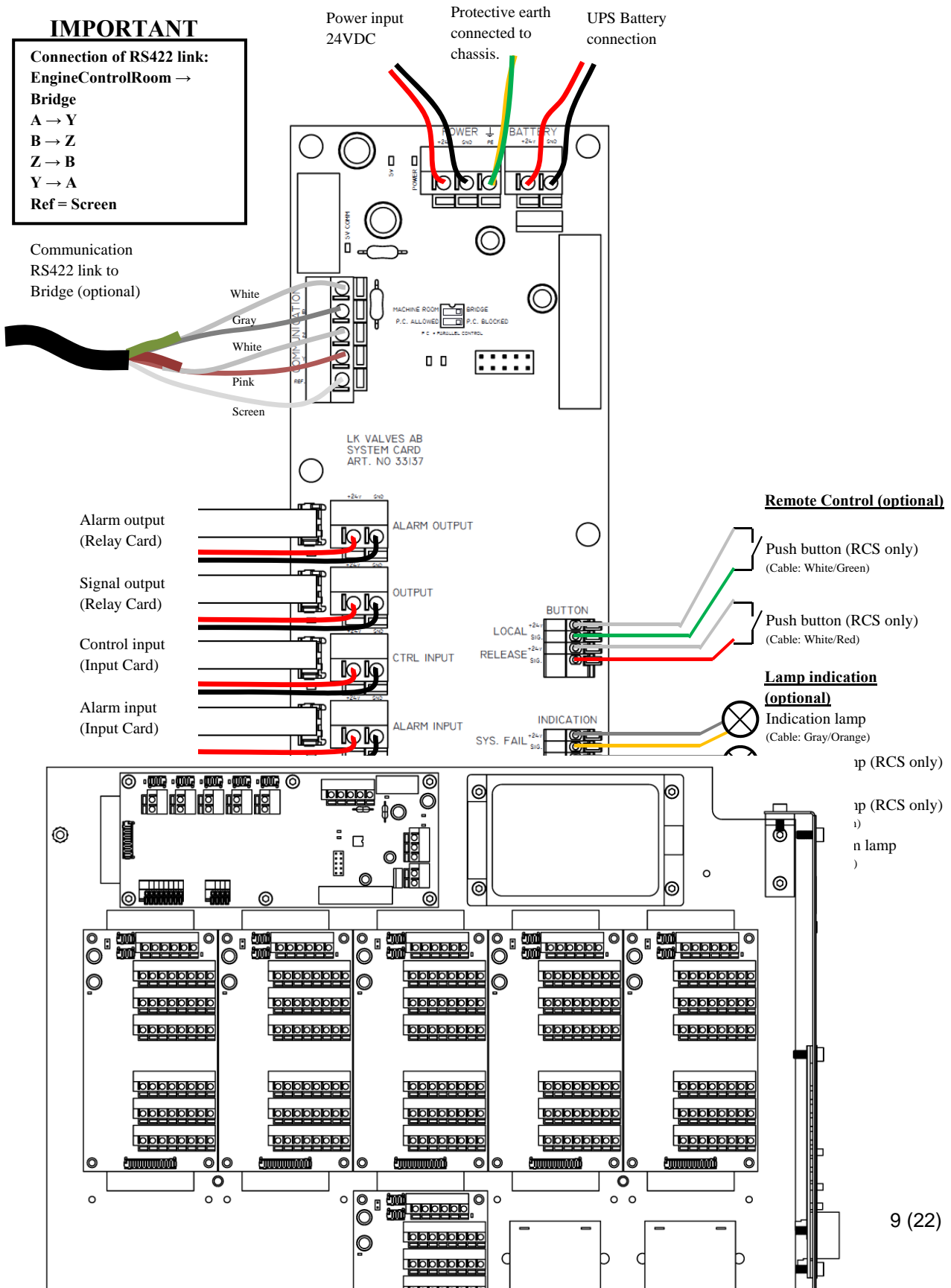
LED test – a local test of all LED’s on the circuit board.

Customizable text



2.4 System Card

The System Card (33137) is the central connection point for the VMS and RCS system. It has built in UPS function with battery backup. The card can be programmed for full duplex remote control systems.

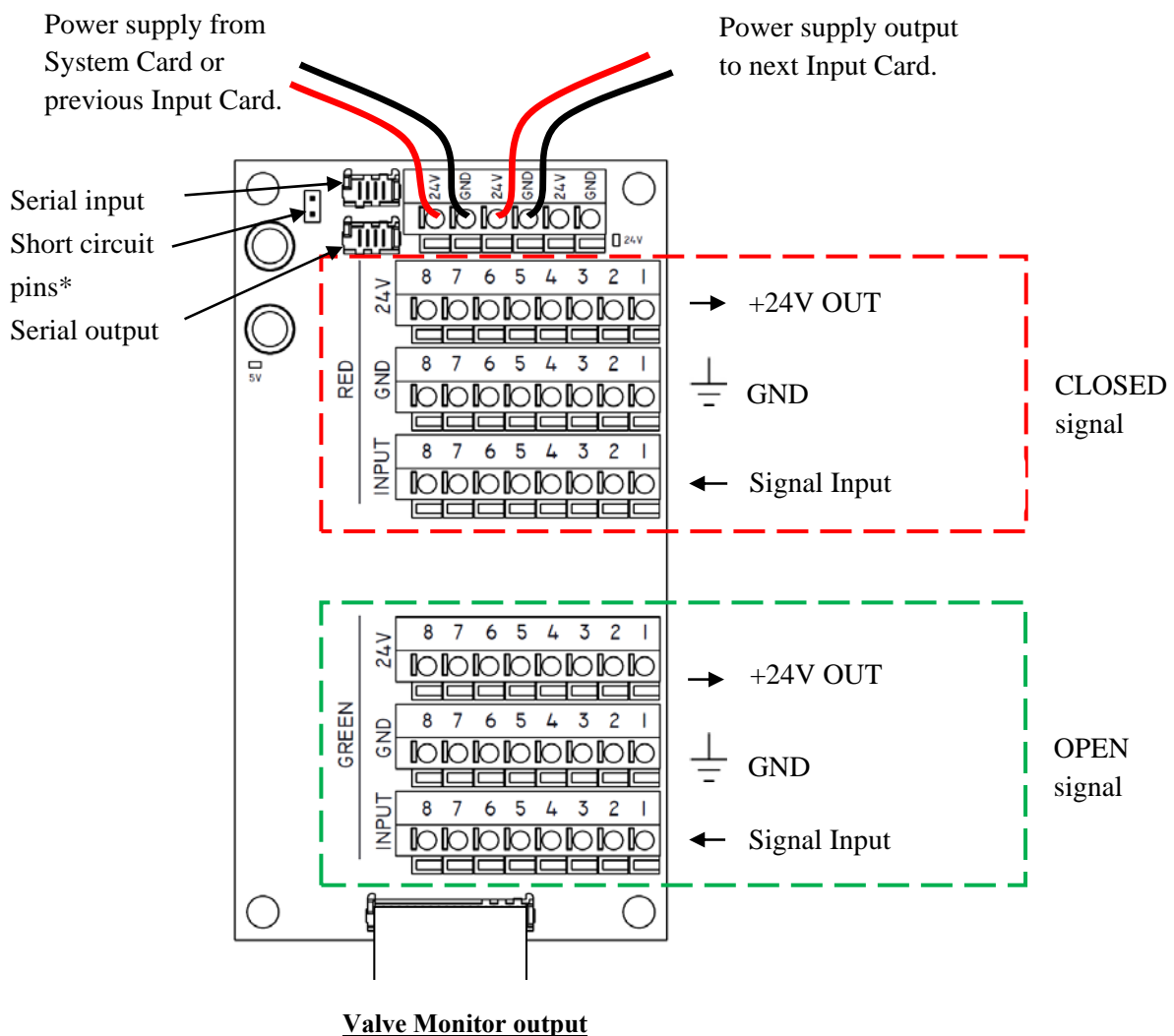


2.5 Input Card

The Input Card (33138) is the connection point of incoming signals from limit switches and inductive proximity switches. Each Input card can handle signals from 16 individual switches. A monitor output is available at the bottom of the card.

Signal inputs

- 8 signals open position
- 8 signals closed position

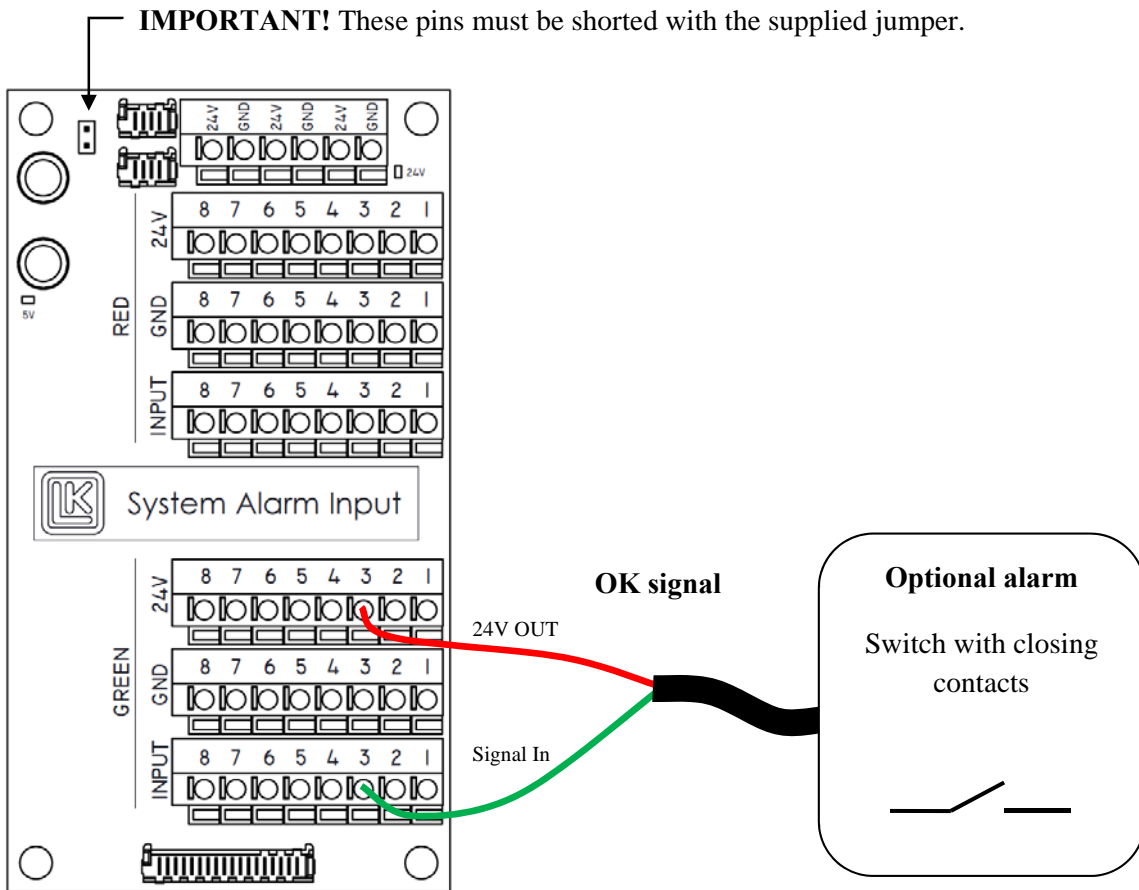


*** IMPORTANT!** These pins must be shorted with the supplied jumper when the card is the last in a serial chain or if used alone.

2.6 System alarm input

One Input Card (33138) is used to connect all system alarm sensors. Optional alarms can be connected to pole 2 and 3.

Alarm Inputs	Indication	Remark
1) Air Supply	OK	Standard
2) Optional 1	OK	<i>Optional</i>
3) Optional 2	OK	<i>Optional</i>
4) Not connected	-	-
5) Not connected	-	-
6) Not connected	-	-
7) Not connected	-	-
8) Not connected	-	-

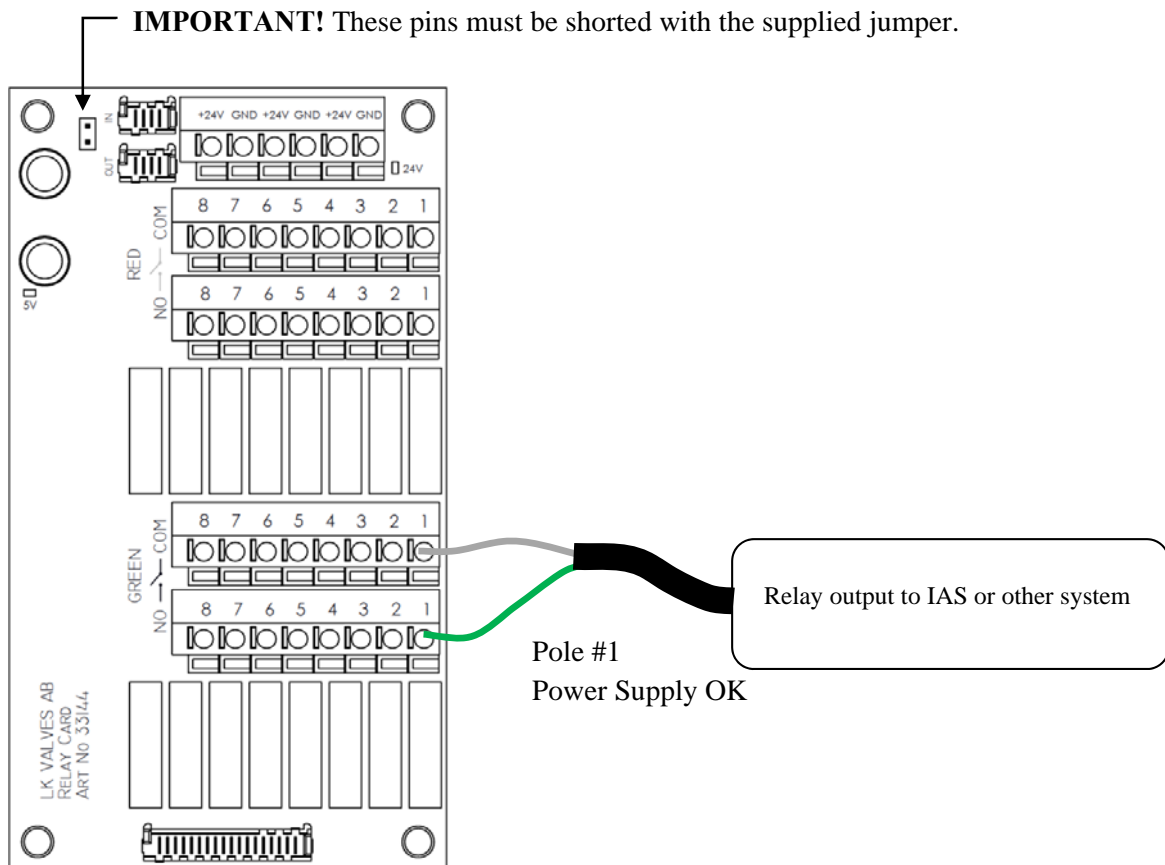


Colour code can change without further notice

2.7 System alarm output

The included Relay Card (33144) gives potential free outputs of system alarms. Relays are of normally open (NO) type, i.e. Closed = OK signal.

Alarm Outputs	Relay type	Indication	Remark
1) Power Supply	NO	OK	Standard
2) Battery	NO	OK	Standard
3) Remote Power Supply	NO	OK	<i>Optional</i>
4) Remote Battery	NO	OK	<i>Optional</i>
5) Air Supply	NO	OK	Standard
6) Optional 1	NO	OK	<i>Optional</i>
7) Optional 2	NO	OK	<i>Optional</i>
8) Sum Alarm	NO	OK	Standard

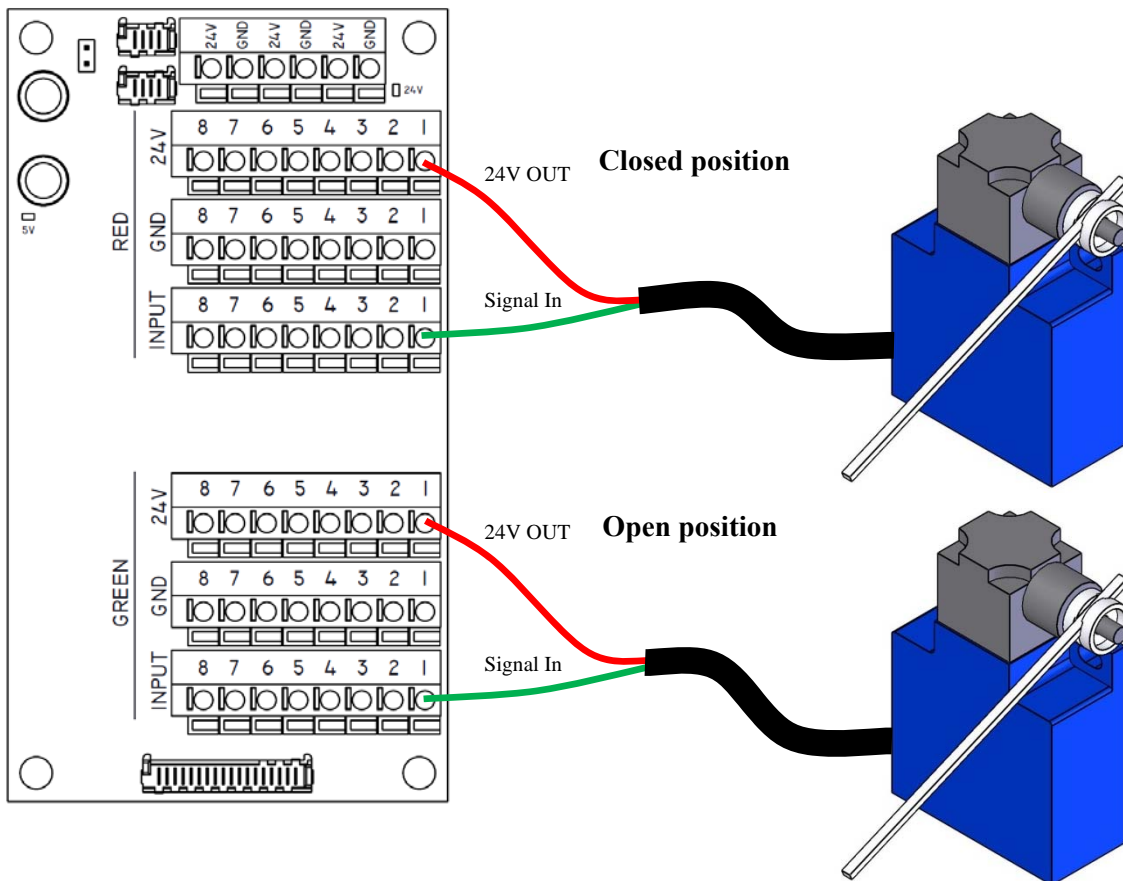


Colour code can change without further notice

2.8 Connecting a limit switch

Indicate open and closed position:

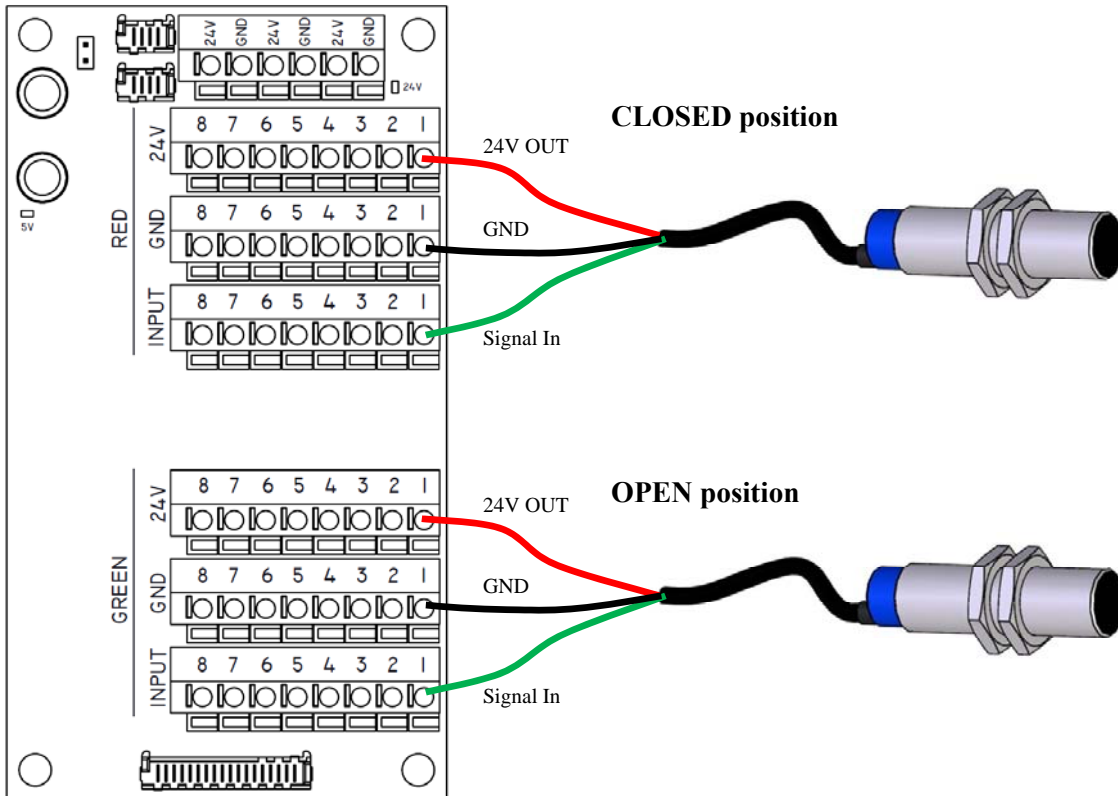
Sensor type- normally open (NO)



2.9 Connecting an inductive proximity switch

Indicate open and closed position:

Sensor type- normally open (NO)



3. VMS with remote display

3.1 Remote display

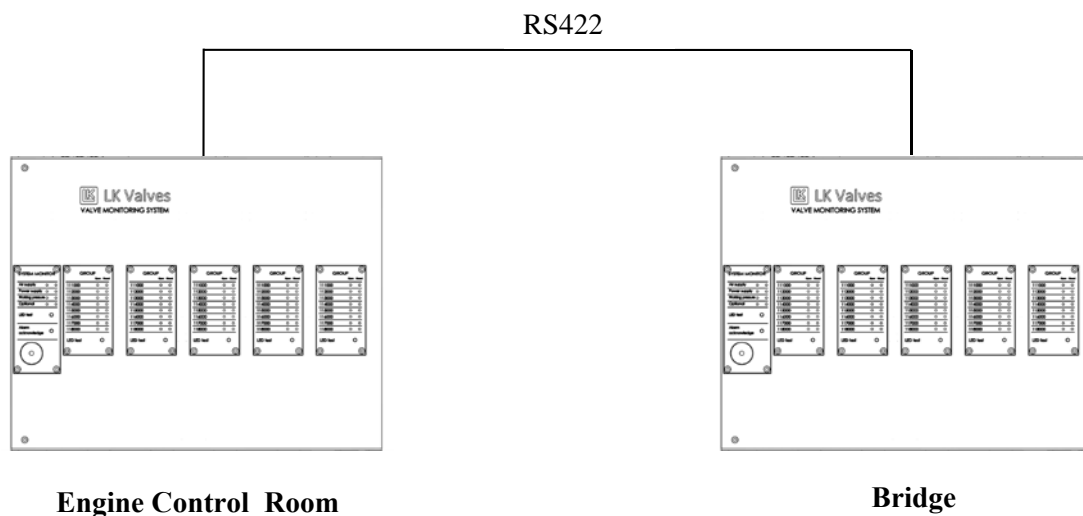
The main VMS is normally mounted in the engine control room (ECR). A second VMS system that displays the same information can be mounted at the bridge.

The signals between systems are carried out in the digital domain via the serial interface (RS422).

Only one 4-core conductor + shield is necessary. The system can drive long cable runs without interference.

It's possible to use our standard display panel at the bridge or we can build a custom display panel that matches your needs. It is also possible to use the relay outputs and connect the signals to an external monitoring system.

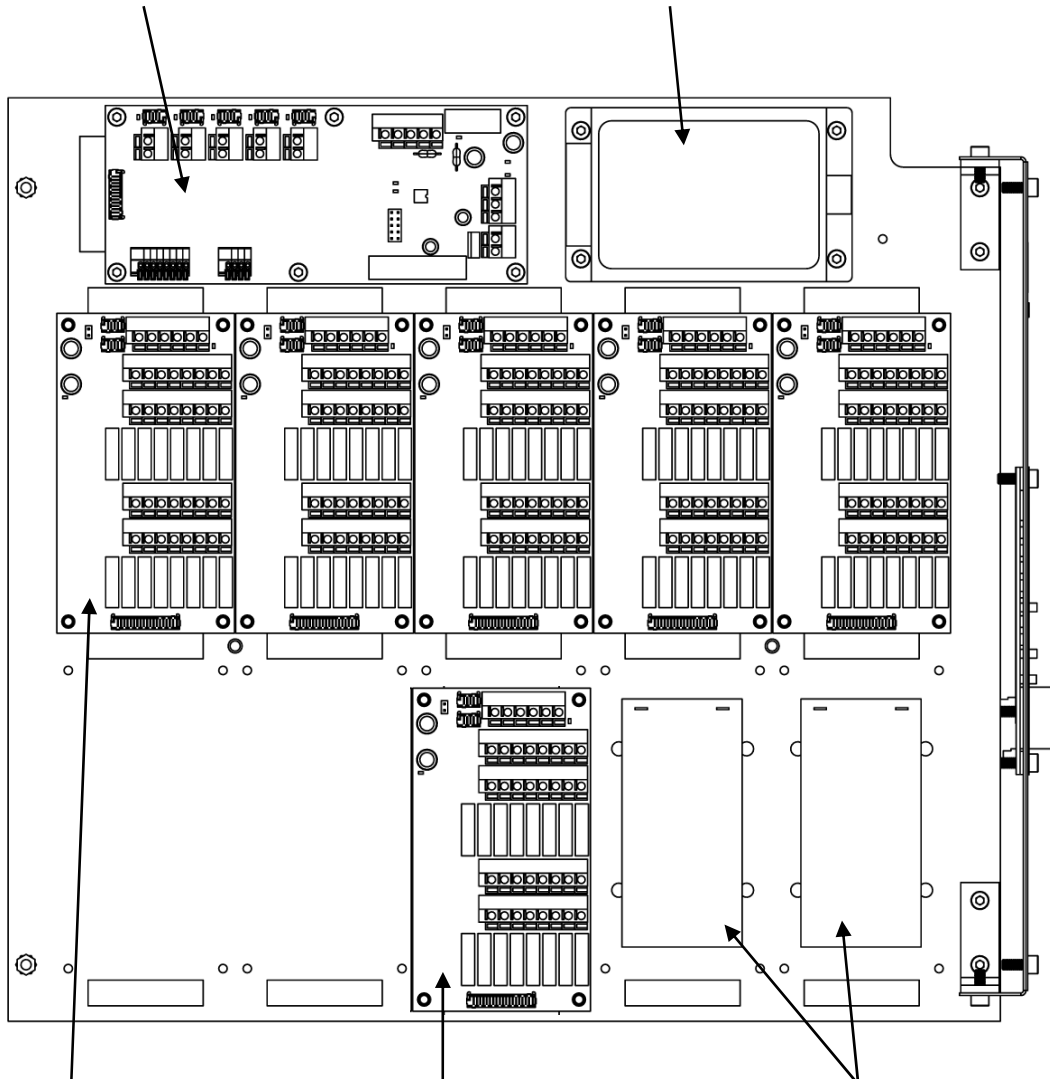
VMS with standard display panel:



The image below shows the remote VMS. The system is equipped with relay outputs of all signals. These outputs are potential free and can be used in external systems. We can also supply custom designed display panels on special request (See following page).

System Card (Bridge)
Art. No: 33137

Power supply
Art. No: 33160



Relay Card (1-10pcs)
Art. No: 33144

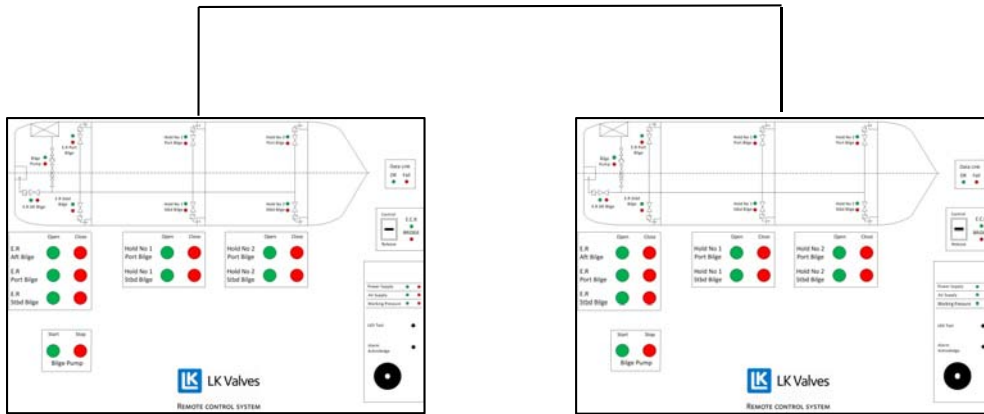
Relay Card (1pcs) for
System Alarm outputs
Art. No: 33144

UPS Battery (2 pcs)
Art. No: 33238

2.2 Custom designed panels

Custom designed display/mimic panels are available on special request.

RS422

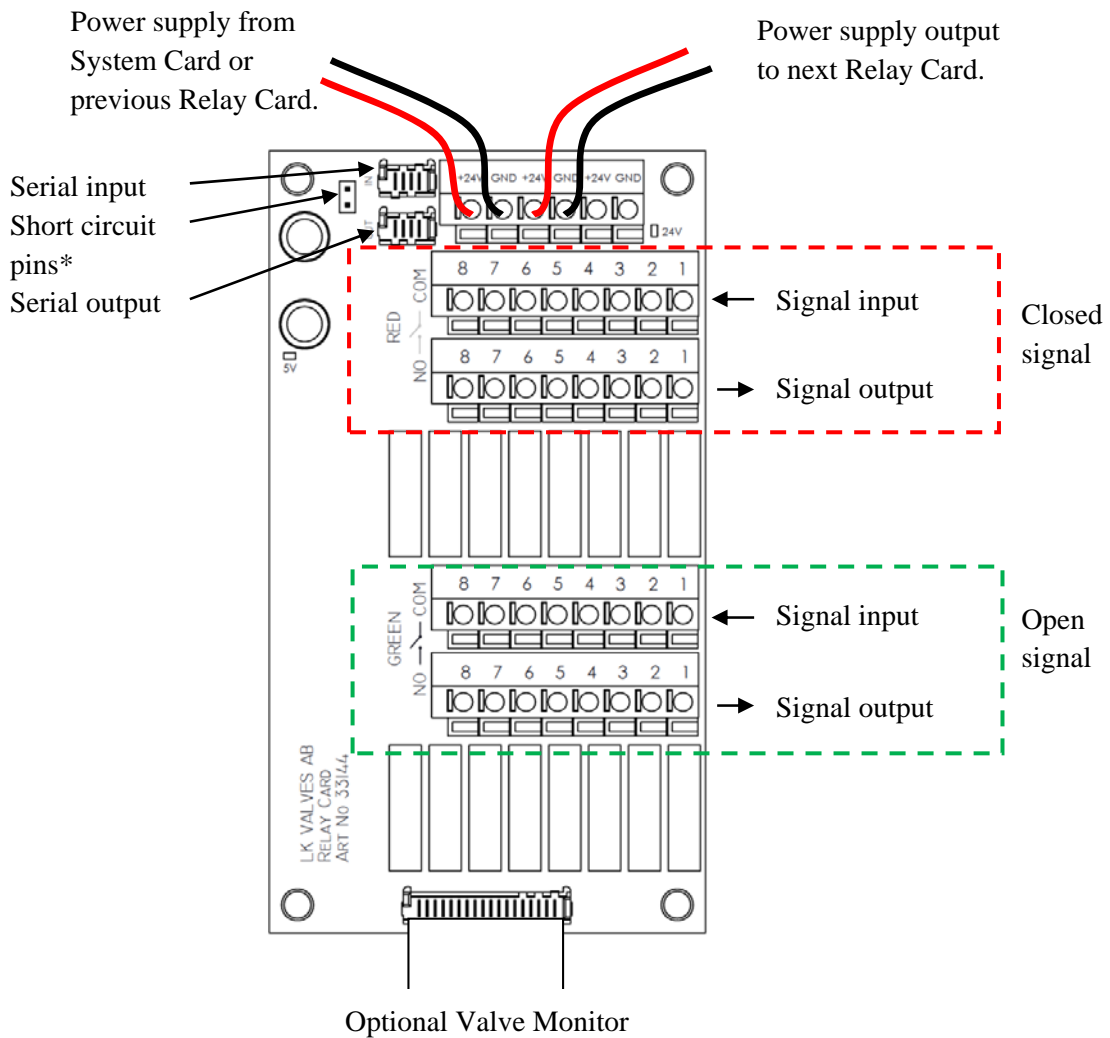


Engine Control Room

Bridge

3.3 Relay card

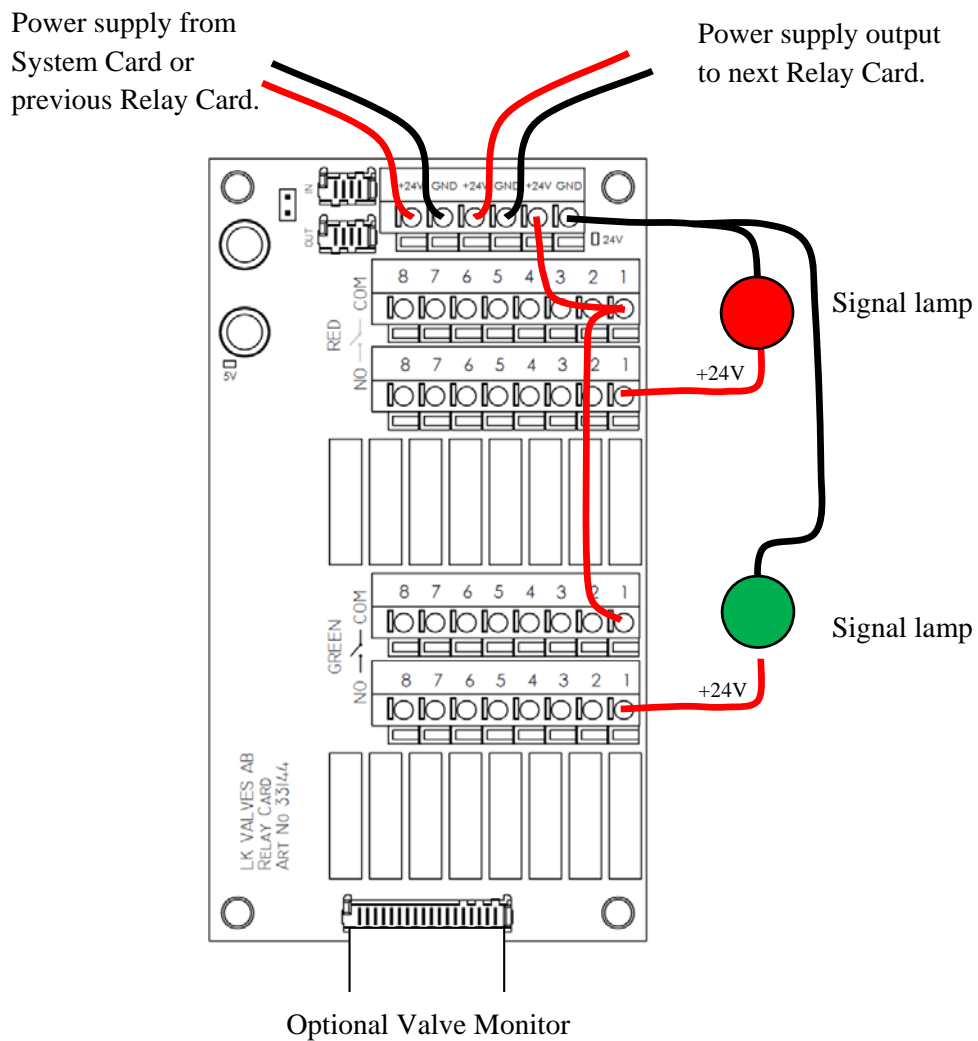
The Relay Card (33144) was designed to supply potential free signal outputs using high quality 3A 250VAC/30VDC capable relays. The relay output can be used to control lamps in a mimic panel, control panel or connected to PLC based systems requiring on/off signals.



*** IMPORTANT!** These pins must be shorted with the supplied jumper when the card is the last in a serial chain or if used alone.

Using the relay card to drive signal lamps:

It is possible to connect the 24V into the relay card outputs. This way the relay card can supply power to drive signal lamps.

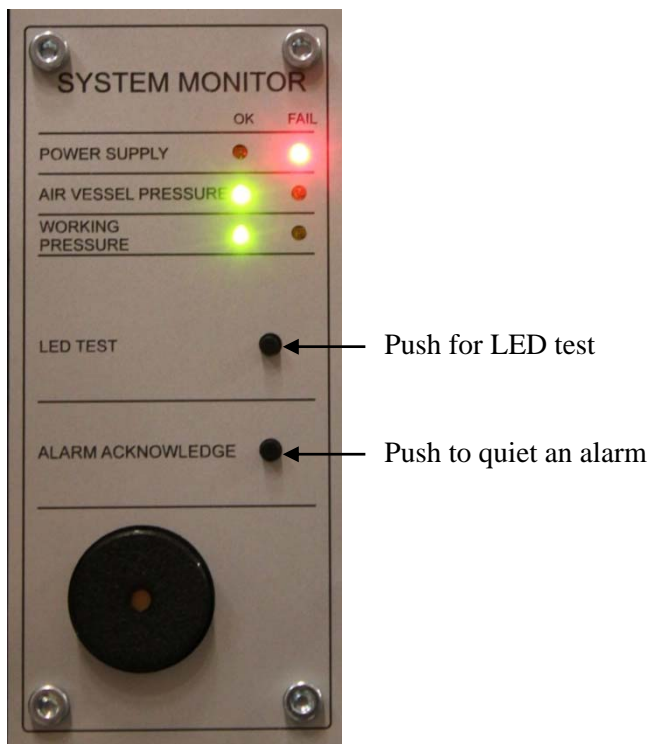


4. Starting up the system

When you have completed the installation of your VMS system it's time to start it up.

- 1) One of the battery connectors are shipped unhooked. This should be connected only after you install main power supply. When the system is up and running - unwrap the insulating tape on the spade connector and connect it to the corresponding battery pole.
- 2) Normally it will take the system up to 2h to accept the charge level of the UPS batteries. When the System Card accepts the battery charge level the System Monitor will display OK status on Power Supply. The time for this process will vary depending on the actual charging level of the supplied batteries.
- 3) Check System Monitor for any alarm signals. It's possible to temporarily quiet any alarm by pushing the "Alarm Acknowledge" button.
- 4) Check air vessel pressure, working pressure and optional alarm.
- 5) When all alarms show OK status (Green LED) the system setup is complete.

The UPS system is intended to be a safety backup for up to 1h. If the system is run on battery only for a longer period of time (>1h) it might drain the batteries completely and damage them.



5. Service and troubleshooting

5.1 Maintenance of UPS batteries



The supplied valve regulated lead-acid battery, Panasonic LC-R121R3P 12V 1,3Ah, have an expected trickle life of 3-5 years @ 25°C working temperature. We recommend changing batteries every 3rd year. Always use same type of battery.

Please read supplied data sheet for detailed information.

Please recycle used batteries!



5.2 Troubleshooting

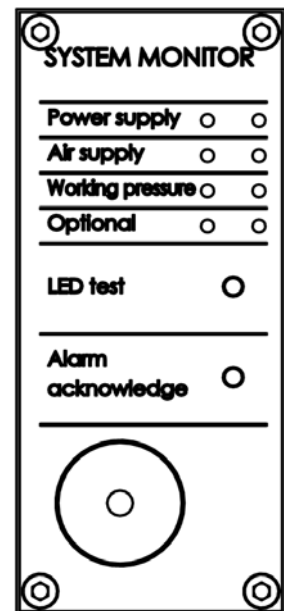
5.2.1 Reading the System Monitor Display

Air supply and optional alarms reflect the system status down in the Engine Control Room. A second remote display system will mirror the display data. The power supply indication differ from the other alarms. When a VMS system is built up with remote display it incorporates 2 individual power supplies. We use pulsed display of remote failures and battery charging. See table below.

POWER SUPPLY

Single VMS:

<i>OK/Green Led</i>	<i>Fail/Red Led</i>	<i>Description</i>
—	off	Power supply and UPS are OK
•••••	off	Battery is charging
off	—	Power supply failure



VMS with remote display system:

<i>OK/Green Led</i>	<i>Fail/Red Led</i>	<i>Description</i>
•••••	—	Local power supply failure - remote system is OK
—	•••••	Remote power supply failure - local system is OK
•••••	off	Battery is charging

SYSTEM FUNCTIONS

VMS with remote display system:

<i>Type</i>	<i>Led</i>	<i>Description</i>
System fail	—	Signal transfer error, system matching error

5.3 Parts list

Item	Art. No
System Monitor	33135
Valve Monitor	33136
System Card	33137
Input Card	33138
Relay Card	33144
Power Supply	33160
UPS Battery	33238

6. Contacts

Your Valve Monitoring System is designed and manufactured by:

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SWEDEN

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