



# **Operating Data Installation Maintenance Instructions**

## **For Multi-Level Switch NCG NCM SERIES**

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## 1. Note

**\*\*\*\*Please read and take note of these operating instructions before commissioning. The instruments may only be used, maintained, and installed by qualified personal familiar with the operating instructions and the applicable health and safety requirements. \*\*\*\***

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## 3. Specific Applications

The Level Control Gauge has been designed for use in level monitoring applications and pump control for liquids

The probe part of the gauge can be manufactured from most non-magnetic materials including plastics. The floats can be either stainless, buna or engineered plastic.

The Multi-Level sensor can be configured from the factory with one to seven switch points set to customer specific locations and switch state.

## 4. Operating Principles

Hermitically sealed reed switches are potted inside the tube on a continuous wire harness. Other models may use a printed circuit board design. The float (stainless, buna or plastic all contain either a rod or ring magnet potted or gripped inside. As fluid moves the float – its magnetic lines of force meet the reed switch – and activate it to either an open or closed state.

N/C – With liquid present – the switch point will be open – contacts not conducting. The contacts will close as the float descends

N/O – With liquid present – the switch point will be closed – contacts will open as the float descends

## 5. Instrument Instructions

The instruments are thoroughly tested and inspected by the factory prior to shipment and sent in perfect working condition. **Should any damage to the device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage please inform your parcel service/forwarding agent immediately, since they are responsible for damages incurred during transit.**

**⚠ CAUTION! This unit contains reed switches that may be permanently damaged by mechanical shock or vibration. Avoid dropping or hitting the device against hard surfaces.**

**⚠ CAUTION!** If the equipment is used in a manner not specified by the manufacturer, protection provided by the equipment may be impaired.

**⚠ CAUTION!** Ensure that the wetted components of the transducer are compatible with the media being measured.

## 6. Technical Specifications

### Technical Data Sheet

Instrument Type	Multi - Level Switch NCG & NCM series
Operating Temperature	Flying leads: -40° ~ 80°C, (Cable: -40°~70°)
Storage Temperature	-50°C ~ 80°C
Max Pressure	80 PSIG
SPST Reed Switch, 70 W max	200 VDC / 150 VAC @0.5A
SPDT Reed Switch, 20 W max (optional)	150 VDC / VAC @ 0.5A
High Temperature 'HT' (optional)	-40°C ~ 120°C

NCM SERIES FLOAT SIZE	SPECIFIC GRAVITY
STAINLESS STEEL 22mm X 40mm	0.93
STAINLESS STEEL 28mm X 28mm	0.66
STAINLESS STEEL 38mm X 26mm	0.56
POLYPROPYLENE FOAM 25mm X 25mm	0.7
CLOSED CELL BUNA 26mm X 25mm	0.7
CLOSED CELL BUNA 25mm X 15mm	0.5
CLOSED CELL BUNA 18mm X 26mm	0.7

NCG SERIES FLOAT SIZE	SPECIFIC GRAVITY
STAINLESS STEEL 50mm BALL	0.65
STAINLESS STEEL 40mm X 35mm	0.68
STAINLESS STEEL 46mm X 76mm (DIFFERENTIAL FLOAT)	0.96
POLYPROPYLENE HOLLOW 47mm X 48mm	0.5
CLOSED CELL BUNA 47mm X 47mm	0.42
CLOSED CELL BUNA 40mm X 45mm	0.4
CLOSED CELL BUNA 30mm X 45mm	0.4

## 7. Mechanical Connections

Use caution when handling the wires, as they can be easily crushed against the head or potting. Ensure that the bottom of the probe does not come in contact with the tank bottom, as the probe will easily bend.

Use a wrench on the larger of the two fittings to install. Do not use any tool or clamp on the actual probe tube.

Special precautions should be taken if installed in a dirty environment with debris in the tank.

## 8. Electrical Connection

**⚠ CAUTION:** Ensure that the voltage levels of your power supply system agree with the voltage levels given on specification sheet.

The transducer is a pilot duty device, good for millions of operations if installed correctly.



**⚠ CAUTION: Make sure all power supplies to equipment are disconnected and locked out prior to installation or maintenance.**

The device must be installed to local electrical codes.

- Improper wiring can lead to damage to this device as well as injury to the user.
- Make sure that installation, wiring and circuit protection are in **accordance with all local electrical codes.**
- Make sure the supply circuit **provides adequate fuse or circuit breaker protection** that is in accordance with the circuit's current rating.
- If supplied with optional connection head. Strip field wiring to 8mm max and make connection to proper terminal block, using color code below wiring table.
- Field wiring must be rated to 80°C for standard units, 125°C for high temp units.

### Wiring Table

#### SPST 70 WATT

- Level 1 – RED
- Level 2 – YEL
- Level 3 – BLU
- Level 4 – BRN
- Level 5 – ORG
- Level 6 - GR

#### SPDT 20 WATT

	<b>Common</b>	<b>N/O</b>	<b>N/C</b>
Level 1	RED	WHITE / RED	WHITE / BLACK / RED
Level 2	YELLOW	WHITE / YELLOW	WHITE / BLACK / YELLOW
Level 3	BLUE	BLACK	ORANGE

The reeds are factory set in the dry position. Be sure to connect the wires and check using an OHM meter **only** per reed switch specifications.

### 9. Adjustments

Multilevel controls are not adjustable.

In some cases, the float can be adjusted to the opposite state by moving the collars and setting the float using an ohmmeter.

## 10. Switch Protection

### **⚠CAUTION IF THE FOLLOWING INSTRUCTIONS ARE NOT FOLLOWED, THE REED SWITCHES IN THIS DEVICE WILL FAIL!**

This device incorporates reed switches which are used for sensing purposes and can only switch very small loads (pilot duty service). They are not designed to directly switch solenoid valves, motors, and other high current devices.

When testing reed switches for operation only use an Ohmmeter and not a light.

The common accepted practice is to use an interface relay rated to handle the required electrical load. In this way, the low current signal from the reed switch energizes the relay coil, which in turn switches the larger load current.

#### **PLEASE READ CAREFULLY!!**

**How to avoid damaging the reed switch:**



**TO PROTECT THE REED SWITCH AGAINST INDUCTIVE KICKBACK, EVEN IF THE RELAY COIL CURRENT RATING IS WELL BELOW THE REED SWITCH RATING:**



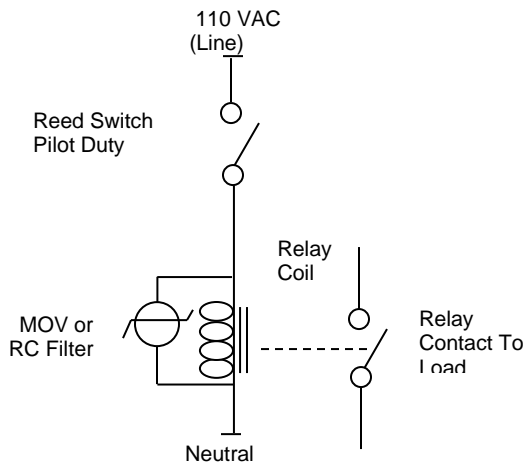
**When a reed switch is used to drive external relays, voltage spikes can be generated at coil activation.**

**If the source is an AC operated device, install a varistor (MOV), or Resistor/Capacitor Filter across the relay coil.**

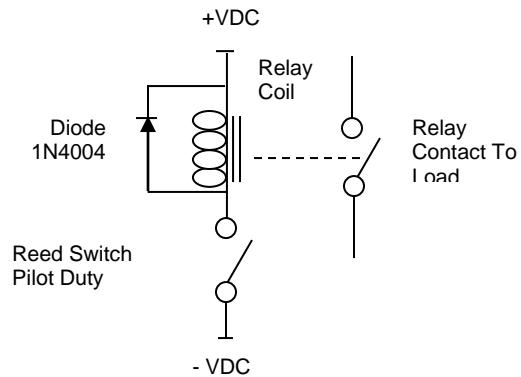
**If the source is a DC operated device, a general-purpose diode (1N 4004) placed across the relay coil prevents electrical spikes. Connect the cathode (banded side) to the more positive side of the coil.**

The reeds are factory set in the dry position. Be sure to connect the wires and check using an OHM meter only per reed switch specifications. All level controls are sold with a NEMA 4 Junction Box option to protect the potted wire exit from unit. If you did not opt for this option.... then water exposed to this area can wick into the unit causing a "closed" condition.

### AC Circuit Example



### DC Circuit Example



MOV Type: GE # V130 LA10

RC Filter Type: Paktron # 0.2uF/220 Ohm @400 V

## 11. Troubleshooting

PROBLEM	CAUSE	SOLUTION
The unit is unresponsive.	Electrical failure.	Use an electrical continuity checker to determine if the switch is functional. If the switch does not operate properly when activated by a magnet, the entire level switch must be replaced.
The unit does not activate when the float changes position.	The unit is jammed.	Remove the level switch from service. Check the float assembly for obstructions or accumulation of particles which may cause binding. If binding is present in the float assembly and cannot be cleared by normal cleaning procedures, the entire control must be replaced.
The float is not buoyant.	The float is collapsed and/or filled with liquid or the correct float was not selected at time of order.	Check the float for ruptures, deformation, and any liquid trapped inside the assembly. If the float is filled with liquid or has collapsed, the entire level switch must be replaced. <b>Do not attempt to repair the float.</b>

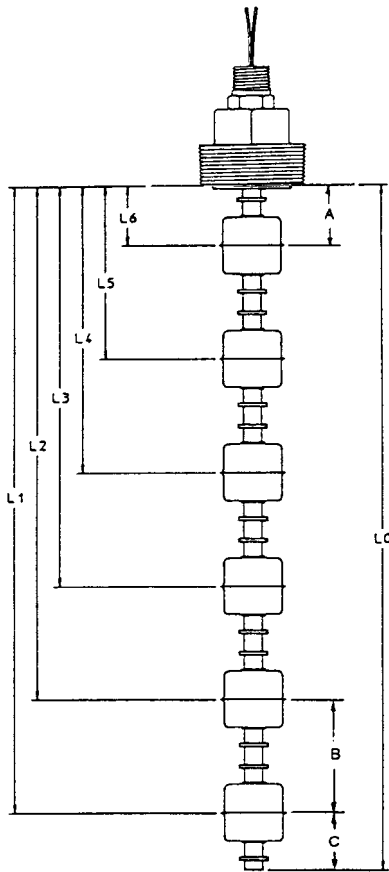
## 12. Maintenance

Preventative Maintenance should be done monthly. Depending on the environment inside the tank, this may need to be more often.

- Disconnect all power to device
- Clean and visually inspect stem, float and stops and electrical connection for any damage.
- If damaged, the unit will need to be replaced, **do not put back in service.**

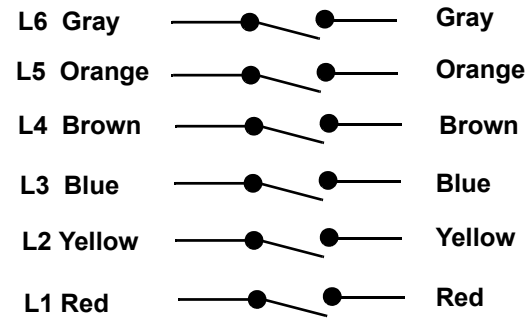
There are no user serviceable parts inside the Level Transducer. If repair is required, please contact your local distributor to return it for repair.

# KOBOLD Series NCG/NCM Multipoint Level Switches Wiring Diagram



A = 3/4" minimum distance to highest level  
 B = 1 1/2" minimum distance between levels  
 C = 1" minimum distance from end of unit to lowest level

## SPST Switch Wiring



## SPDT Switch Wiring

