FLOAT-BASED DIGITAL CONTENTS GAUGING SYSTEM

FDCG98 range
Product Data

A publication of LPG Measurement Technology (Australia) Pty. Ltd.

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SYSTEM OVERVIEW

The FDCG98 system is a electronic LPG bulk storage contents gauging system. The system utilises existing Rochester "Senior" and "Magnatel" gauges for measurement, converting contents level to digital form for remote readout.

Key advantages

The FDCG98 systems provide a range of exciting features in a single package:

- System retrofits straight on to Rochester "Senior" or "Magnatel" gauges.
- Remote display of tank contents information – site operator does not have to leave the service desk.
- Alarms for tank low, extremely low and tank full.
- Power-line communication technology allows retrofit to existing sites without the need to dig up the ground to lay cables (FDCGP98 models only).
- Safe Class-1 Zone-1 (Australia) equipment.
- Safety controls: Pump disable when liquid level too low and fill disable when liquid level too high ("S" class models only).
- Australian designed and built by a wholly Australian-owned company.

Mechanical configuration

The FDCG98 contents gauging system comes in two main configurations: FDCGP98 series and FDCGW98 series.

The FDCGP98 product line system comprises three major components: the **magnetic coupler**, **processing unit** and **remote readout**. The communications link between processing unit and remote readout is via existing mains power lines. They are arranged as shown in Figure 2 below. The optional **full/empty safety control lines** are also depicted.

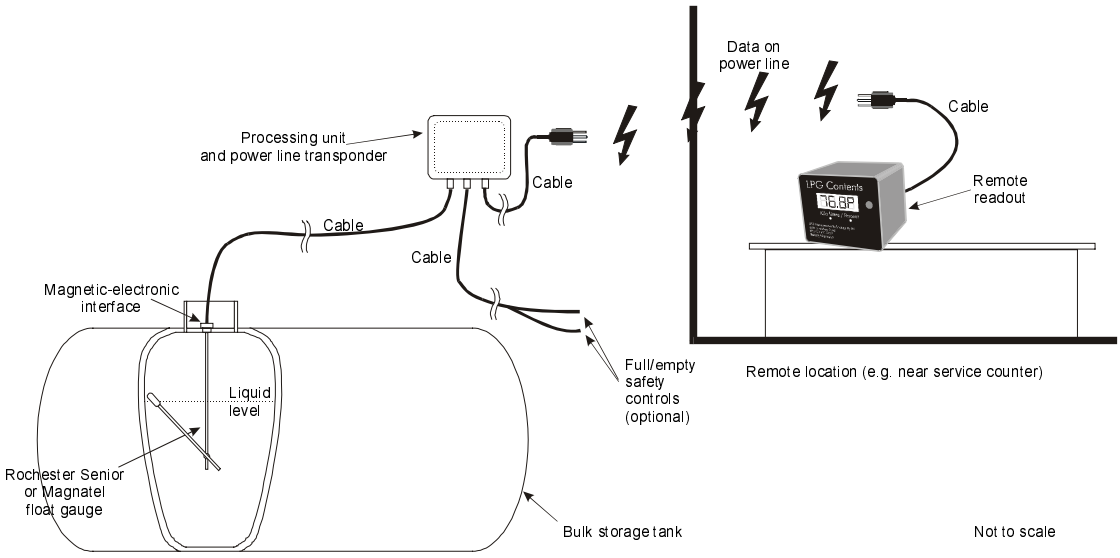

Figure 1: FDCGP98 series major components symbolic diagram

The FDCGW98 product line system comprises two major components: the **magnetic coupler** and **remote readout**. The communications link between processing unit and remote readout is via fixed wiring. They are arranged as shown in Figure 2 below. The optional **full/empty safety control lines** are also depicted.

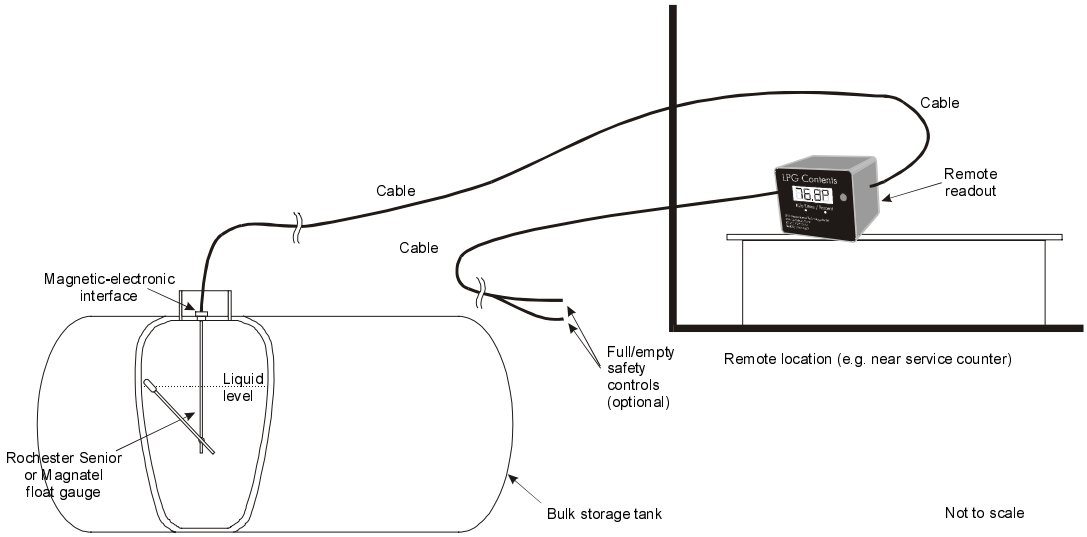

Figure 2: FDCGW98 series major components symbolic diagram

General operation

The LPG liquid level ratio is measured by the float gauge. The float gauge magnetic coupling is converted into an electrical signal, which is processed by the processing unit and converted into digital form. This data is then transmitted to the remote readout and presented to the operator on a digital readout.

An optional safety system is also available to provide solid-state relay control signals to disable pump-out when liquid is below a preset level, and to disable filling when liquid is below a maximum preset level.

Up to 4 contents gauges may be installed on a single power phase.

Additional remote readouts may be attached to the same power phase to enable remote readout at multiple locations.

Applications

The FDCG98 series is ideally suited to contents gauging of bulk storage tanks commonly used at LPG service stations and depots. The system can often be retrofitted to existing sites with no down-time at all. The FDCGP98 system provides even easier retrofitting, as no new cables need to be laid between the tank and the remote readout.

Product numbers

Product	Description
FDCGP98	Float-based Digital Contents Gauging System using mains communication.
FDCGP98S	Float-based Digital Contents Gauging System using mains communication with pump safety shut-off control.
FDCGW98	Float-based Digital Contents Gauging System using fixed wire connection between processing unit and remote readout.
FDCGW98S	Float-based Digital Contents Gauging System using fixed wire connection between processing unit and remote readout and pump safety shut-off control.
FDCGRD98	Additional Remote Readout

Table 1: Product numbers

Flexibility for you

At LPG Measurement Technology we take pride in our ability to meet our customers needs. If you have special requirements or would like a special configuration, our development division has the experience and expertise to do the job. Please contact us for more information.

INSTALLATION DATA

Equipment installation

Site requirements

Prior to contents gauge system installation, the site must satisfy the following requirements:

Requirements for all models

- Requires Rochester "Senior" or "Magnatel" type float gauges to be installed and operational.

FDCGP98 series additional requirements

- 240V mains available to processing unit, and area near remote readout (must be same phase).

FDCGW98 series additional requirements

- Ability to lay two shielded data cables between float gauge and remote readout.

Environment recommendations

- The magnetic coupler, processing unit and remote readout should be protected from environmental extremes (weather, temperate and humidity) as much as reasonably possible. It is highly recommended that the top section of the magnetic coupler and the processing unit be shielded by covers to prevent accidental damage and radiant heat.
- LCD displays, when exposed to direct sunlight, will slowly deteriorate. Keep the LCD displays in the remote readout shielded from direct sunlight as much as possible.

Calibration

For proper operation, the contents gauging system must be calibrated on-site. Calibration simply involves correct positioning of the magnetically-coupled dial connected to the Rochester gauge.

Processing unit configuration (FDCGP98 models only)

The processing unit requires wiring connections to mains power, the float gauge magnetic coupler and the remote readout. Installation must be performed by a qualified technician. The mains communication system will operate over both standard 220-240V and 110-120V 50Hz or 60Hz supplies, as long as the power selector switch inside the unit is set correctly by the installer.

Remote readout configuration

In most cases, the remote readout will be configured for proper operation at time of manufacture. The remote readout will operate on both standard 220-240V and 110-120V 50Hz or 60Hz supplies, as long as the power selector switch inside the unit is set correctly by the installer.

Full/empty safety controls

If full/empty safety pump control is required, additional issues must be considered.

FDCG98P series: AC motor control lines will need to run from the processing unit to the AC control box/pump control box

FDCG98Wseries: AC motor control lines will need to run from the remote readout to the AC control box/pump control box

STRUCTURAL DATA

The SSCGL98 system is broken down into three main parts: the **magnetic coupler**, **processing unit** and **remote readout**, as shown in Figure 2 on pp. 5. Each part will be presented in turn.

Float gauge interface section

The float gauge is magnetically coupled to a special device that converts magnetic needle position into an electrical signal. It is pictured below.

Figure 3: Float gauge magnetic-coupler

FDCGP98 series: The signal from this device passes to the processing unit for manipulation and transmission to the remote readout over the mains connection.

FDCGW98 series: The signal from this device passes to the remote readout directly over fixed wires.

Processing unit (FDCGP98 series only)

The data processing module converts the raw signals from the magnetically-coupled device to digital liquid level data. The processing module provides data (over the power mains) to the remote readout and directly controls the (optional) full and empty safety relays.

The enclosure contains a power supply, a data processing module and a power-line communication module. The full/empty safety version (FDCGP98S series) also contains solid state relays and support circuitry.

Remote readout

The remote readout provides the contents gauging information on a large LCD display as shown in Figure 4 below. The enclosure is 9" x 5.5" and 4" deep

Figure 4: Remote readout user interface

Volume is indicated as a percentage and as kilolitres.

FDCGP98 series only: A single connection directly to the mains is all that is required for operation of the device. The single mains connection provides power and communication to the unit. Note that the remote readout must be connected to the same phase as the processing unit.

FDCGW98 series only: The remote readout requires connection to power and a connection to two wires from the magnetic coupler.

ADDITIONAL SPECIFICATIONS: FDCGP98 SERIES

System	
Environment	Electronic equipment: Commercial-grade rating -20°C to +75°C Protect parts from radiant heat and sunlight

Magnetic coupling device	
Power requirements	None
Cabling	Two-core shielded data cable
Communication	4-20mA

Processing unit	
Power requirements	110-120V or 220-240V switch-selectable 50Hz or 60Hz
Power consumption	50W typical
Measurement accuracy	Limited by accuracy of float gauge and accuracy of calibration

Remote readout	
Power requirements	110-120V or 220-240V switch-selectable 50Hz or 60Hz
Power consumption	50W typical

Full/empty safety lines		**FDCGP98S only**
Level too low	Mode Spec	Designed for motor active control in switchboard Can handle 2A max
Level too high	Mode Spec	Designed for fill-line flow control Can handle 2A max

Level alarms	
Available alarms	Liquid level extremely low Liquid level low Tank full
Alarm levels	Pre-set (specified on order)

Power-line communications	
Modem type	Asynchronous FSK modem for mains communication
Communications channel	1200 bits per second, half-duplex
Standard	Complies with EN 50065-1 CENELEC standard. 132.45 kHz carrier frequency.

Table 2: FDCGP98 series specifications

ADDITIONAL SPECIFICATIONS: FDCGW98 SERIES

System	
Environment	Electronic equipment: Commercial-grade rating -20°C to +75°C Protect parts from radiant heat and sunlight

Magnetic coupling device	
Power requirements	None
Cabling	Two-core shielded data cables (Typically up to 250m length)
Communication	4-20mA

Remote readout	
Power requirements	110-120V or 220-240V switch-selectable 50Hz or 60Hz
Data cable requirements	Requires connection to wires from magnetic coupling device
Power consumption	50W typical

Full/empty safety lines		**FDCGW98S only**
Level too low	Mode Spec	Designed for motor active control in switchboard Can handle 2A max
Level too high	Mode Spec	Designed for fill-line flow control Can handle 2A max

Level alarms	
Available alarms	Liquid level extremely low Liquid level low Tank full
Alarm levels	Pre-set (specified on order)

Table 3: FDCGW98 series specifications

This document and its contents is intended to contain accurate and current information. However, errors and omissions may exist, and neither the author nor LPG Measurement Technology Pty. Ltd. accept liability for any such errors or omissions.

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