JERGUSON®
A Division Of The Clark-Reliance Corporation

Specialists in Liquid Level Indication

Installation, Operation and Maintenance for

JMS Series 2 Wire 24V Loop Powered

Ultrasonic Level Transmitters

Section:	JS100
Bulletin:	JS100.62
Date:	10/1/04

OPERATION

Ultrasonic pulses transmitted from the transmitters face are reflected from the surface of the liquid and are received back by the same transmitter. Measurement of the time delay between the transmit and receive signals enables the microprocessor controlled electronics to calculate distance to the liquid level.

Once the transmitter is programmed with bottom reference of the application – usually the bottom of the tank – the liquid depth is calculated. The microprocessor controls the loop current to give a 4-20mA output signal proportional to the level, with the liquid level reading also available on LCD display inside the enclosure. All transmitters have integral temperature compensation to maintain accuracy across the operating temperature range.

FEATURES

- **2 Wire 24Vdc loop powered**
- **Operating ranges up to 36 Ft.**
- **Measures liquid height, distance to liquid, contents or flow in open channels**
- **Simple push button calibration**
- **Built-in LCD display**
- **Automatic temperature compensation**

ADVANTAGES

- Eliminates problems experienced with contacting instrumentation
- Eliminates costly installation and mounting
- Simplified set-up and operation
- Minimal maintenance once installed

BENEFITS

- Lost cost of installation
- Low cost of commissioning
- Minimal maintenance cost
- Process downtime minimized

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JERGUSON® GAGE AND VALVE
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Features
- 2 Wire 24V dc loop powered
- Operating ranges up to 36 ft.
- Measures liquid height, distance to liquid, volume or flow in open channels
- Simple push button calibration
- Built-in LCD display
- Automatic temperature compensation

Advantages
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Benefits
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JMS ADVANCED ULTRASONICS

This new family of ultrasonic non-contacting liquid level transmitters is the latest generation of level measurement instrumentation. Proven in thousands of applications in many industries, state of the art electronics coupled with time proven ultrasonic transducer technology has resulted in an easy to use instrument with the high reliability and quality readings usually associated with more expensive products.

EASY TO USE LOCAL MENU PROGRAMMING

Once installed using the 2" thread, either directly to the vessel or on a suitable bracket above the liquid surface, 3 internal buttons are used to program the transmitter with the tank depth and the range for the 4-20 mA output.

A built-in LCD display under the cover is provided to aid setting up. The user navigates through an intuitive menu, entering data as prompted by the transmitter. Intelligent software ensures only data specific to the chosen application is requested, minimizing programming time.

Programming using a PC or HART compatible communicator

The JMS400RH and JMS900GH are HART compatible and may be accessed remotely on the 2 wire loop. Using M H-Conf401, the user can access all set-up and diagnostic parameters for interrogation or change.

Alternatively, universal HART programming tools loaded with the transmitter Device Description (from the HART foundation CD) may be used. If the DD is not loaded, the user can still access and change some parameters using universal and some common practice commands.

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Choosing the right model

Each of the three models in the JMS range provide features which make them suitable for specific duties, as shown below:

Simple level measurement		
Model	26ft range	**JMS422**
	36ft range	**JMS400RH**
Level measurement and local relays		
Model	36ft range	**JM400RH**
Level measurement in a hazardous area		
Model	36ft range	**JMS900GH**
Flow or volume measurement		
Model	Safe area	**JMS400RH**
	Hazardous area	**JMS900GH**

JMS422

ENTRY LEVEL

The JMS422 entry level transmitter is designed specifically for use in the many industrial applications where economical liquid level measurement with a 4-20mA output proportional to level is required.

The tough weatherproof nylon body and corrosion resistant PVDF wetside make the JMS422 suitable for a wide range of applications.

Installation is simple and economic using the 2" thread. (Mounting bracket available as an optional extra.)

Programming is achieved in under two minutes with minimal data entry required.

Applications

- Filter bed level
- Storage tank levels
- Effluent pits
- Reservoir level

JMS400RH

INTEGRAL RELAYS

The JMS400 level transmitter offers all the features of the entry level JMS422 with the addition of HART digital communications and two integral relays to provide local control functionality over an increased range of 36 ft. The relays are signal relays designed to operate in alarm or fault mode.

The user may also choose to configure the JMS400 to calculate volume in a vessel or flow in an open channel according to several pre-programmed laws:

- Horizontal cylinder or sphere
- 5/2 and 3/2 flow laws
- Parshall flumes
- Manning formula

Alternatively, a 10 point DIY curve is available (use HART programmer for this mode).

Applications

- Inventory control
- Buffer tanks
- Open channel flow

TECHNICAL SPECIFICATIONS

	JMS422 FM	**JMS400RH**
Duty	Level, distance	Level, distance, volume, flow
Measuring range	1.0 ft to 26 ft	1.5 ft to 36 ft
Process temperature	-4°F to +158°F	-22°f to +158°F
Power supply	2 wire, 24V dc loop powered	2 wire, 24V dc, loop powered
Output	4-20mA	4-20mA
Digital communications	None	HART
Integral relays	None	2 x SPST 1A @ 24V dc
External temperature probe option	None, integral only	Accepts MS-RTP input (see accessories)
Certification	Safe area use only	Safe area use only
	FM General electrical use	FM General electrical use (Pending)
Ordering information	MS422-B28: 2" BSPT mounting	MS400RH-B28: 2" BSPT mounting
	MS422-N28: 2" NPT mounting	MS400RH-N28: 2" NPT mounting

JMS900GH

INTRINSICALLY SAFE

The JMS900GH level transmitter is intrinsically safe certified for use in hazardous areas. Power must be supplied through a suitable I.S. barrier. HART digital communications are also provided.

With a PVDF wetside, the JMS900GH can be used in most hazardous and corrosive applications

The JMS900GH may be used to measure distance, level or calculate volume or flow in an open channel according to several pre-programmed laws:

- Horizontal cylinder or sphere
- 5/2 and 3/2 flow laws
- Parshall flumes
- Manning formula

Alternatively, a 10 point DIY curve is available (use HART programmer for this mode).

Applications

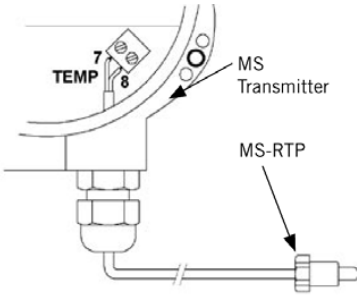
- Inventory control
- Buffer tanks
- Open channel flow

JMS900GH
Level, distance, volume, flow
1.5 ft to 36 ft
-22°F to +158°F
2 wire, 24V dc loop powered
4-20mA
HART
None
Accepts MS-RTP input (see accessories)
ATEX II 1 G EEx ia IIC T6
CSA (C & US) Intrinsically safe (pending)*
MS900GH-A: 2" BSPT mounting ATEX
MS900GH-U: 2" NPT mounting CSA*

*The product is being tested by CSA in accordance with Canadian and UL standards. It will then be certified accordingly.

ACCESSORIES

JMS-RTP remote temperature probe



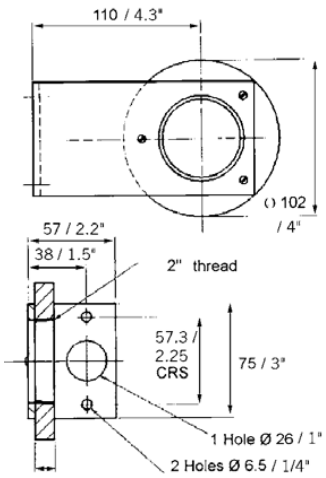
The JM-RTP probe is designed to be used with the JMS400RH and JMS900GH transmitters in applications where fast ullage temperature changes or unrepresentative transmitter temperatures are a problem. The probe is simply installed in the vessel ullage space or in a shaded area of an open channel and wired back to the transmitter using the 16 ft of cable provided. When the JMS-RTP is connected, the integral temperature probe is automatically overridden.

JMS-BRK mounting bracket

315 Stainless Steel angle bracket with UPVC mounting boss to facilitate transmitter installation.

JMS-BRK2: 2" BSPT fitting

JMS-BRK3: 2" NPT fitting



JM-H-CONF401 programming tool

This Windows-based PC software package allows full remote interrogation and programming of the JMS400 and JMS900 transmitters using the HART protocol.

The product comprises a CD with software and manuals, plus a HART modem and a hard-key. Modems and hard-keys are available in USB or serial/parallel forms.

ADDITIONAL TECHNICAL DATA

Ambient temperature	JMS400/900:	-40°F to +140°F
	JMS422:	-4°F to +258°F
Operating pressure		-3.6 psi to + 43 psi
Accuracy*	JMS400/900:	< . /-0.1"
		> . ±0.25% of measured range
	JMS422:	< . <±0.2"
		> 3.3 ft; ±0.5% of measured range
Resolution		<1/16"
Weatherproof rating		NEMA 4
Materials of construction		Dryside: Glass filled nylon: Wetside: PVDF
Weight		2lb
Electromagnetic compatibility		EN61326 Class B

*Under reference conditions

UNIVERSAL CONTROL UNITS

IDEAL FOR PROGRAMMING & CONTROL OF THE JMS RANGE OF TRANSMITTERS

JMCU900

CONTROL UNIT

The JMCU900 series of wall and panel mounting control units provide comprehensive control functionality for any 4-20mA or HART compatible transmitter. A backlit display gives clear visual indication of the measured value and status of all inputs and outputs.

Mounted in a non-hazardous area, the mains powered JM C900 provides a protected 24V dc power supply to the transmitter, which may be installed in a hazardous area.

5 relays are provided and are fully field programmable to perform a wide variety of control, fault indication or alarm duties.

Control unit features and applications

- Tough, weatherproof wall-mount enclosure for internal or external mounting. Panel mount units require just 6.5" clearance behind the panel
- Accepts any 4-20mA or HART compatible input, allowing standardization of control units display.
- Supports two voltage free contact closure inputs, allowing override of control functions on external triggers.
- Pre-programmed tank shapes, flow algorithms and pump control routines simplify configuration. A 20 point DIY facility is provided for non-standard applications.
- Real time clock allows energy savings routines and pump efficiency calculations.
- 5 voltage free SPDT relays for alarm and control duties.
- 4-20mA 12 bit isolated current output proportional to calculated value.

SUMP TRANSMITTER

FACTORY SEALED FOR WETWALL APPLICATIONS

JMS900SH

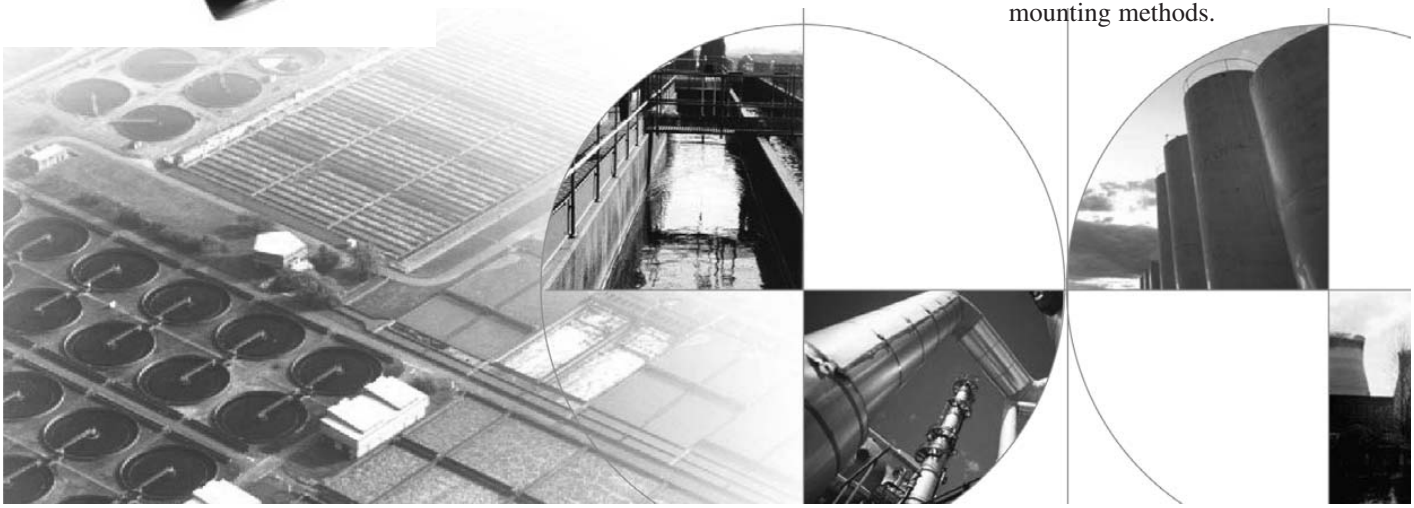
LEVEL TRANSMITTER

The JMS900SH is a sealed 4-20mA loop powered level transmitter specifically designed for use in waste water and effluent treatment plant on aqueous applications.

Certified intrinsically safe for use in Zone 0 areas, the rugged UPVC transmitter is factory fitted with up to 165 ft of two core cable for simple low cost installation in sumps, wet-walls and over open channel flow structures.

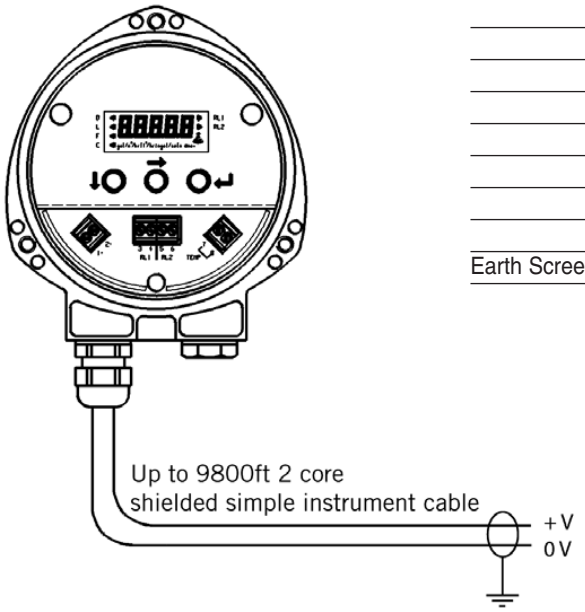
The JMS900SH can be connected directly to a plant control system or used with a JM C900 control unit.

- 4-20mA output proportional to measured or calculated value.
- Factory sealed NEMA 6P for use in wet-walls and sumps up to 9 ft deep. Option of submersion shield to protect transmitter face from contamination if well is subject to flooding.
- Rugged all UPVC construction ideal for application on exposed sites such as reservoirs, river or remote works.
- Supplied compete with 315SS mounting bracket and 1" lock nut to facilitate fast and low cost installation using either rigid or suspension mounting methods.



WIRING DIAGRAM

Wiring diagram

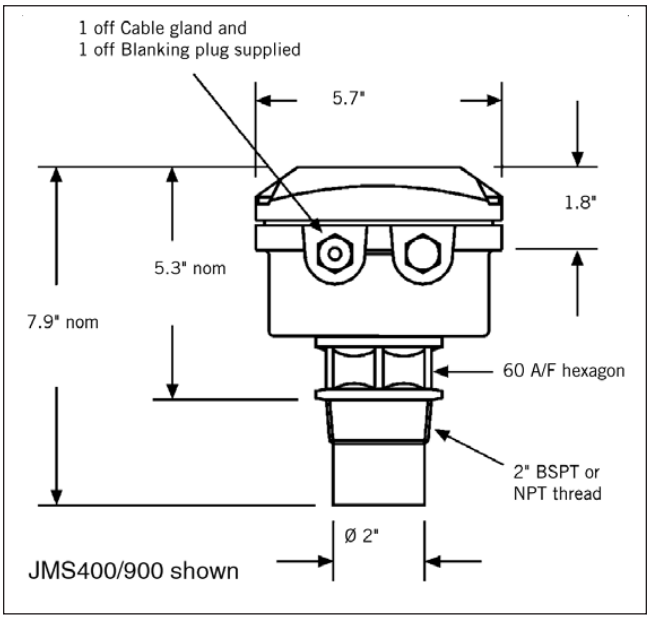


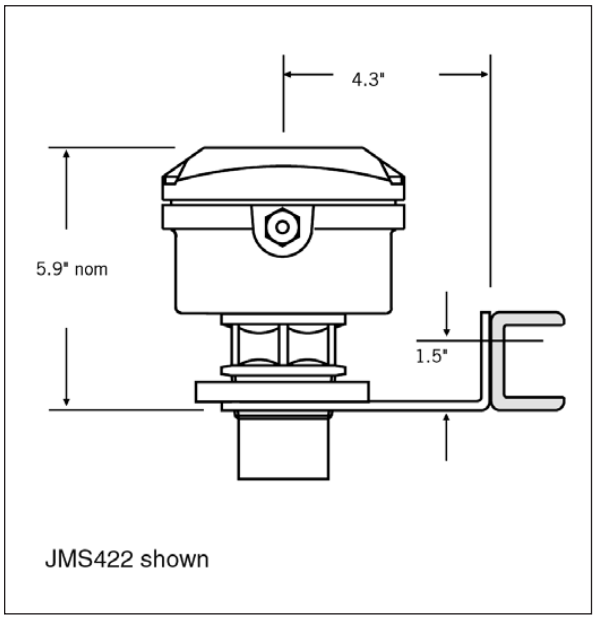
TERMINAL		
1	: +24V dc	
2	: 0V dc	
3	: RL1 (SPST)	MS400 only
4	: RL1 (SPST)	
5	: RL2 (SPST)	
6	: RL2 (SPST)	
7	: MS-RTP temperature probe (if used)	
8	: MS-RTP temperature probe (if used)	
Earth Screen	: Connect to a standard earth in the control room	

	NOMINAL	RANGE	I.S. LIMITS
JMS422	24V dc	12-30V dc	n/a
JMS400	24V dc	12-40V dc	n/a
JMS900*	24V dc	12-40V dc	12-30V dc
All models	Min. voltage required at terminals: 12V dc at 21mA loop current		

*Power must be supplied through a suitable I.S. barrier or from JM C900

DIMENSIONAL DETAILS





Note: Transmitters are not suitable for mounting in 2" NB pipe. A minimum of 3" NB is required. Use a plastic flange if mounting onto a tank or standpipe.

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