



**Non-contact microwave technology**

**+/- 1 mm accuracy**

**Density measurement/Hybrid gauge**

**Antennas tailored for specific applications**

## The L&J Engineering Model MCG 1600 Radar Gauge State-of-the-Art FMCW Technology

### Application Specific Dual Microprocessors

At the heart of the MCG 1600 is a high integration core microprocessor which can be customized to specific applications. A separate DSP microprocessor provides high speed measurement and algorithm processing for high accuracy, obstruction avoidance, self-calibration, and echo cancellation. All programmed and processed information can be displayed on the gauge's 80-character LCD as well as an optional ground level display.

### Antennas

Years of experience have enabled L&J Engineering to provide the optimal antenna configuration for a given application. Three antenna designs, parabolic, cone and stillwell, accommodate various process parameters which include surface conditions, height to measure, dielectric constant of product and internal obstructions.

### Ground Level Display

The optional Ground Level Display (MCG 1350 GLD) is a remote LCD display which is identical in form and function to the display on the main unit. It enables complete programming and calibration functions via the hand-held infrared calibrator, MCG 2150.

### Inventory Management

The MCG 1600 Radar Gauge, which transmits level and temperature data, can be remotely accessed by a computer/receiver such as the MCG 3900 via the 4-wire "Tankway." Product temperature is obtained by using a 3-wire R.T.D. (copper or platinum) which is connected to an on-board analog-to-digital converter. It is no longer necessary to climb to the top of the tank to access the desired information or perform any of the programming functions. Simple plug-in interface modules emulate most existing, as well as custom field protocols or analog outputs.

## Applications

**Liquid level gauging of virtually any corrosive, contaminated or viscous product including;**

oil	chemicals	gasoline	paraffin
tar	molten sulfur	phosgene	pharmaceutical base products
latex	polyethylene	titanium dioxide	cryogenic or liquified gases
limestone rock	chocolate	molten aluminum	

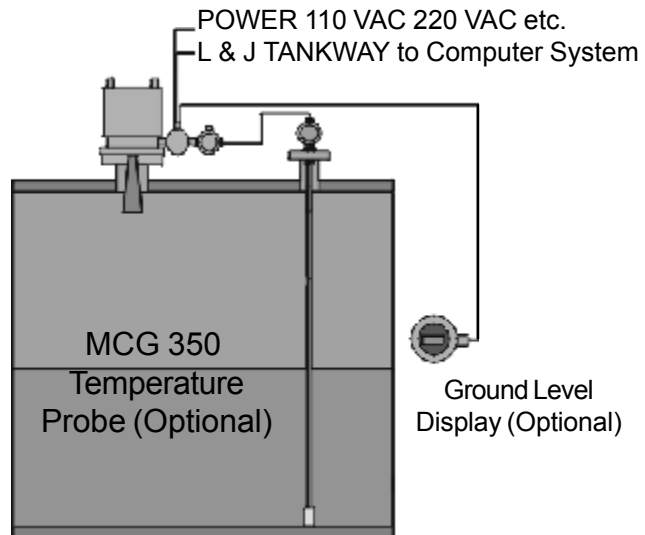
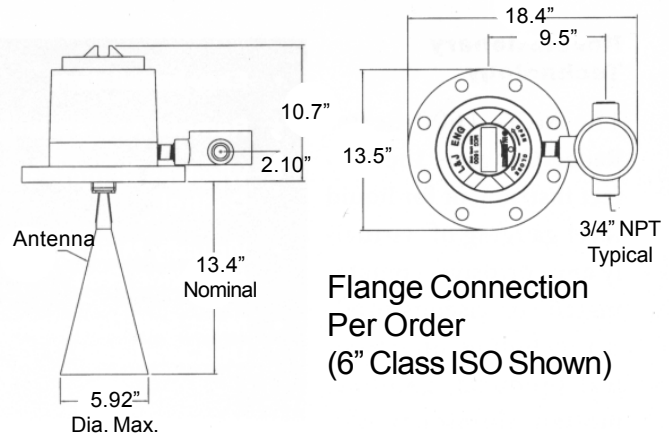
### SPECIFICATIONS

Measuring Principle:	FMCW Radar
Range:	0-75 (23m) feet standard. Up to 180 feet (55m) optional
Accuracy:	+/-1mm, depending on the installation
Resolution:	+/-1 mm
Radar Power:	Less than 1mw (0dBm)
Electronics Temperature:	-40° F to 150° F (-40° C to +65° C)
Product Temperature:	-148° F to 482° F (-100° C to 250° C)
Local Display:	4 line, 80 Character LCD
Optional Remote Display:	Ground Level Display (4 line 80 LCD)
Communications:	L&J "Tankway" (standard) Up to 128 MCG field devices Other Mfgs. Protocols
I/O Option:	Two 4-20mA Out Two 4-20 mA In
Temp Option:	Single or dual RTD Temp Avg. Probe (CU/PT)
Control Options:	2 points, 4 contacts
Power:	110VAC, 240VAC, 24VDC @10W Other voltages available
Lightning Protection:	Comprehensive Surge Protection Standard
Max. Pressure:	150PSIG (or 300PSIG optional)
Construction:	Cast Aluminum Std. Stainless Steel Opt.
Mounting:	6" ANSI Class 150 Flange Standard, Others Optional including DIN and JIS
Weight:	23 lbs. - AL
Safety Approvals:	Explosion Proof/ *Intrinsically Safe Class I, Div. 1, Group B, C & D UL, CUL Approved FCC APPROVED KEMA approved EExd IIC T6
Antennas:	Parabolic, Cone, Stillwell

\*requires MCG 2350 accessory

*All designs subject to change. Certified dimensions and specifications available upon request.*

### DIMENSIONS



### INFORMATION REQUIRED TO ORDER:

**MCG 1600- XX - YY - ZZ - AA - BB**

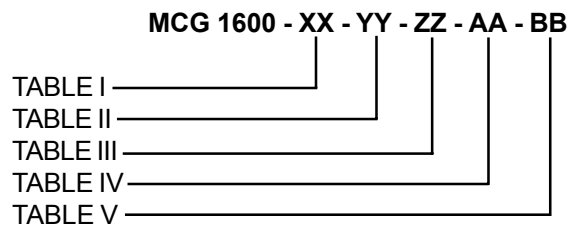
FLANGE TYPE/CONST. MATERIAL \_\_\_\_\_  
 ANALOG INPUT/OUTPUT \_\_\_\_\_  
 CONTACT OUPUTS \_\_\_\_\_  
 SIGNAL OUPUTS/TEMP. INPUTS \_\_\_\_\_  
 APPROVAL/POWER SUPPLY \_\_\_\_\_

### MCG 1600 RADAR LEVEL GAUGE

### MCG 2150 HAND-HELD FIELD CALIBRATOR (One Required)

#### MODEL NUMBER SELECTION:

The model number will have a base number, **MCG 1600**, followed by 10 digits. These digits will represent 5 sets of option tables.



#### TABLE I - FLANGE TYPE / MATERIAL OF CONSTRUCTION

- 04 - 150 # ANSI, 4" FF, Aluminum Flange - Aluminum Housing
- 05 - 150 # ANSI, 6" FF, Aluminum Flange - Aluminum Housing
- 06 - 150 # ANSI, 8" FF, Aluminum Flange - Aluminum Housing
- 07 - 150 # ANSI, 10" FF, Aluminum Flange - Aluminum Housing
- 12 - 150 # ANSI, 8" RF, Carbon Steel Flange - Aluminum Housing
- 13 - 150 # ANSI, 10" RF, Carbon Steel Flange - Aluminum Housing
- 16 - 150 # ANSI, 8" FF, Carbon Steel Flange - Aluminum Housing
- 17 - 150 # ANSI, 10" FF, Carbon Steel Flange - Aluminum Housing
- 20 - 150 # ANSI, 4" RF, 316 S.S. Flange - 316 S.S. Housing
- 21 - 150 # ANSI, 6" RF, 316 S.S. Flange - 316 S.S. Housing
- 22 - 150 # ANSI, 8" RF, 316 S.S. Flange - 316 S.S. Housing
- 23 - 150 # ANSI, 10" RF, 316 S.S. Flange - 316 S.S. Housing
- 24 - 150 # ANSI, 4" FF, 316 S.S. Flange - 316 S.S. Housing
- 25 - 150 # ANSI, 6" FF, 316 S.S. Flange - 316 S.S. Housing
- 26 - 150 # ANSI, 8" FF, 316 S.S. Flange - 316 S.S. Housing
- 27 - 150 # ANSI, 10" FF, 316 S.S. Flange - 316 S.S. Housing
- 32 - 150 # ANSI, 8" RF, Carbon Steel Flange - 316 S.S. Housing
- 33 - 150 # ANSI, 10" RF, Carbon Steel Flange - 316 S.S. Housing
- 36 - 150 # ANSI, 8" FF, Carbon Steel Flange - 316 S.S. Housing
- 37 - 150 # ANSI, 10" FF, Carbon Steel Flange - 316 S.S. Housing
- 40 - 300 # ANSI, 4" RF, 316 S.S. Flange - 316 S.S. Housing
- 41 - 300 # ANSI, 6" RF, 316 S.S. Flange - 316 S.S. Housing
- 42 - 300 # ANSI, 8" RF, 316 S.S. Flange - 316 S.S. Housing
- 43 - 300 # ANSI, 10" RF, 316 S.S. Flange - 316 S.S. Housing
- 44 - 300 # ANSI, 4" FF, 316 S.S. Flange - 316 S.S. Housing

### Table I FLANGE TYPE (CONTINUED)

- 45 - 300 # ANSI, 6" FF, 316 S.S. Flange - 316 S.S. Housing
  - 46 - 300 # ANSI, 8" FF, 316 S.S. Flange - 316 S.S. Housing
  - 47 - 300 # ANSI, 10" FF, 316 S.S. Flange - 316 S.S. Housing
  - 52 - 300 # ANSI, 8" RF, Carbon Steel Flange - 316 S.S. Housing
  - 53 - 300 # ANSI, 10" RF, Carbon Steel Flange - 316 S.S. Housing
  - 56 - 300 # ANSI, 8" FF, Carbon Steel Flange - 316 S.S. Housing
  - 57 - 300 # ANSI, 10" FF, Carbon Steel Flange - 316 S.S. Housing
- Din Flange Types Available. Consult Factory

### TABLE II - ANALOG INPUT / OUTPUT (User Configurable)

- |  |  |
|--|--|
| 0X - Level Only                                      | X0 - None                                      |
| 1X - Level and BS+W (from external source)           | X1 - Single 4-20MA Output                      |
| 2X - Level and Density (from external source)        | X2 - Dual 4-20MA Output                        |
| 3X - Level, BS+W, and Density (from external source) | X3 - Single 4-20MA Input                       |
|  | X4 - Single 4-20MA Input, Single 4-20MA Output |
|  | X5 - Dual 4-20MA Input                         |

### TABLE III - CONTACT OUTPUTS

- 00 - None
- 01 - 2 Dry Contacts
- 02 - 4 Dry Contacts

### TABLE IV - SIGNAL OUTPUTS / TEMPERATURE INPUTS

- |  |  |
|--|--|
| 00 - None  | 27 - Full Mod Buss, RS 485 (4-wire), Spot Temperature*     |
| 01 - L&J Tankway                                       | 28 - ENRAF, Spot Temperature*                              |
| 02 - GPE 31422, 31423                                  | 29 - CIM, TiWay, Spot Temperature*                         |
| 03 - 6 Dry Contacts                                    | 2A - TI, TiWay, Spot Temperature*                          |
| 03 - Varec (4-wire)                                    | 2B - L&J RS 232, Spot Temperature*                         |
| 04 - Varec Matrix                                      | 2C - L&J RS 485 (2-wire), Spot Temperature*                |
| 05 - Full Mod Buss, L&J Tankway                        | 2D - L&J RS 485 (4-wire), Spot Temperature*                |
| 06 - Full Mod Buss, RS 485 (2-wire)                    | 3E - Varec HART, Spot Temperature*                         |
| 07 - Full Mod Buss, RS 485 (4-wire)                    | 61 - L&J Tankway, Average Temperature**                    |
| 08 - ENRAF   | 62 - GPE 31422, 31423, Average Temperature**               |
| 09 - CIM, TiWay  | 63 - Varec (4-wire), Average Temperature**                 |
| 0A - TI, TiWay   | 64 - Varec Matrix, Average Temperature**                   |
| 0B - L&J RS 232  | 65 - Full Mod Buss, L&J Tankway, Average Temperature**     |
| 0C - L&J RS 485 (2-wire)                               | 66 - Full Mod Buss, RS 485 (2-wire), Average Temperature** |
| 0D - L&J RS 485 (4-wire)                               | 67 - Full Mod Buss, RS 485 (4-wire), Average Temperature** |
| 0E - Varec HART  | 68 - ENRAF, Average Temperature**                          |
| 21 - L&J Tankway, Spot Temperature*                    | 69 - CIM, TiWay, Average Temperature**                     |
| 22 - GPE 31422, 31423, Spot Temperature*               | 6A - TI, TiWay, Average Temperature**                      |
| 23 - Varec (4-wire), Spot Temperature*                 | 6B - L&J RS 232, Average Temperature**                     |
| 24 - Varec Matrix, Spot Temperature*                   | 6C - L&J RS 485 (2-wire), Average Temperature**            |
| 25 - Full Mod Buss, L&J Tankway, Spot Temperature*     | 6D - L&J RS 485 (4-wire), Average Temperature**            |
| 26 - Full Mod Buss, RS 485 (2-wire), Spot Temperature* | 6E - Varec HART, Average Temperature**                     |
|  | 6F - SAAB Spot Temp  |

### TABLE V - APPROVAL / POWER SUPPLY

01	-	110 VAC , UL/CSA
02	-	24 VDC, UL/CSA (60VDC Max) *
03	-	48 VDC, UL/CSA (70VDC Max) **
05	-	220 VAC , UL/CSA
06	-	48 VAC, UL/CSA
07	-	24 VAC, UL/CSA
08	-	65 VAC, UL/CSA
31	-	110 VAC , CENELEC
32	-	24 VDC, CENELEC (60VDC Max) *
33	-	48 VDC, CENELEC (70VDC Max) **
35	-	220 VAC , CENELEC
36	-	48 VAC, CENELEC
37	-	24 VAC, CENELEC
38	-	65 VAC, CENELEC

\* For use with + 24 and + 48 VDC Nominal Supply Voltages

\*\* For use with L & J Field Powered Applications only

**Note:** Antenna to be Entered Separately as per Application Requirement.

810670 Conical Horn Antenna Requires 6" opening  
810671 SS Parabolic Antenna Requires 16" opening  
810782 6" Stilling Well Antenna SS  
810783 8" Stilling Well Antenna SS  
810784 10" Stilling Well Antenna SS  
810785 12" Stilling Well Antenna SS

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