



- Level, Temperature and Optional Discrete/Analog I/O
- WinFlash™ Program/Configuration Updates
- Wireless Infrared Programming
- Monitor Field/Internal Parameters
- Advanced Flash Memory Technology
- No batteries or Eproms
- Low Power

## The L&J Engineering Model MCG 2000SFI Smart Flash Infrared Encoder/Transmitter



### UK Distributor

t: +44 (0)1388 813433  
f: +44 (0)1388 813307  
sales@orangecounty.co.uk  
www.orangecounty.co.uk

### Innovative

L&J Engineering, the company with the first Absolute Optical Encoder/Transmitter has raised the bar on the competition once again with the release of its MCG 2000 SFI (Smart Flash Infrared series) Encoder/Transmitter. First, it was the MCG 2000 with its patented in-line optical encoder. Then, it was the integration of optional hardware and software features on a single board in the MCG 2000SS version. Next, it was the addition of the infrared programmability in its MCG 2000SSI, allowing to program options in the transmitter without hardware connections and without violating explosion proof area requirements. Now, L&J Engineering introduces the MCG 2000 SFI. Using the L&J WinGauge™ gauging system or the WinFlash™ application program on a laptop, transmitters can be easily diagnosed or configured over the standard communication bus or via the local display. In addition, new or updated programs can be downloaded to any MCG 2000 SFI transmitter into its on-board flash memory “on the fly” to incorporate communication protocol changes and additional functionality.

### Compact, Yet Powerful

L&J has uniquely designed the MCG 2000SFI Smart Flash series of Encoder/Transmitters to require only one PC board! The elimination of unnecessary mechanical parts coupled with the latest in microprocessor technology, communicates level, spot or average temperature, controls pumps and valves, four - 4-20mA inputs and two - 4-20mA outputs and enables field calibration at the unit or a remote ground level display or via the communication bus in the control room.

### Patented Technology

L&J utilizes the patented “In-line” absolute, optic encoder. Infrared emitters and detectors convert the mechanical shaft position into a digital signal. No wires or brushes are used; virtually eliminating the possibility of wear. To further simplify the mechanics, a machined gear train is used to couple the gauge shaft to the encoder disks. This configuration is completely unaffected by power failures. When power is restored, the transmitter will accurately reflect the current level; even if it has changed. No additional calibration is required.

### Versatility

The MCG 2000SFI is engineered to mount easily to all popular models of mechanical gauges. In addition to the entire Shand & Jurs series of tape gauges, mounting kits for many competitors’ models are available. Special conversion kits, for non-standard units, are available, upon request. Emulation modules have been developed for all major protocols. These newly-designed intelligent modules incorporate both the proper electrical and protocol information. Each have a resident microprocessor and memory and can be replaced on-site, without replacing the P.C. Board. This facilitates the transition from one data highway to another.

## Applications

Converts mechanical level measurements into electronic data

Transmits process data such as temperature (spot or average), pressure and alarms

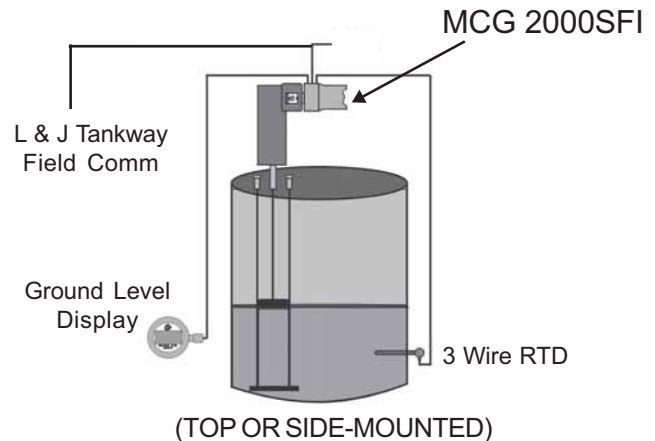
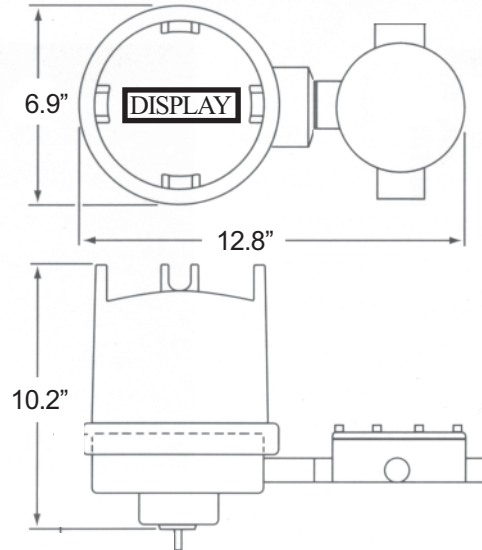
Installed in bulk liquid storage vessels for the Petroleum, Petrochemical, Chemical, Pharmaceutical, Food & Beverage, and Water Treatment Industries

### SPECIFICATIONS

<b>Accuracy:</b> (Over Full Range)	1/16th" (1.6mm) Std. 1/32nd" (0.8mm) Opt.
<b>Range:</b>	0-96 Feet (0-29M)
<b>Shaft Rotation:</b>	Selectable - Clockwise or Counterclockwise
<b>Digital Conversion:</b>	Absolute Optic Encoding
<b>Calibration:</b>	Feet and 1/16th" Feet and 1/32", Millimeter
<b>Power Consumption:</b>	0.7W - Back light off 35V DC, 20mA (Tankway)
<b>Power Options:</b>	24/48/65/110/220 VAC, 24/35-60 VDC
<b>Temperature</b>	
<b>Inputs:</b>	Platinum or Copper
<b>Sensing:</b>	Spot 3-Wire RTD (1-2), Average Temp. (Opt.)*
<b>Accuracy:</b>	0.5° F (0.3° C)
<b>Resolution:</b>	0.1° F (0.06° C)
<b>Baud Rate:</b>	300-9600 Selectable
<b>Lightning Protection:</b>	Comprehensive Surge Protection
<b>Control Option:</b>	2 Points (Valves and/or pumps)
<b>I/O Option:</b>	2 4-20mA Output 4 4-20mA Input 4 Programmable Dry Contacts 6 CAM Switches
<b>Field Wires:</b>	4-Field Wires, (Tankway) 20AWG Minimum
<b>Protocol:</b>	Plug in modules to emulate most protocols including Modbus, Profibus, Hart, Enraf, Varec
<b>Safety Approvals:</b>	Explosion Proof*/Intrinsically Safe Class I, Div. 1, Groups C&D UL, CSA (SS/SSI) Australia SAA (SS) CENELEC/ATEX II 2G, EEx d IIB T6

\*Requires MCG 2350 accessory

### DIMENSIONS



### INFORMATION REQUIRED TO ORDER:

**MCG 2000 (F) - AB - CD - EF - GH - IJ**

COUPLING/APPROVAL \_\_\_\_\_  
 INPUTS AND TEMP. \_\_\_\_\_  
 SWITCHES \_\_\_\_\_  
 OUTPUT \_\_\_\_\_  
 CONTROL POINTS/POWER \_\_\_\_\_

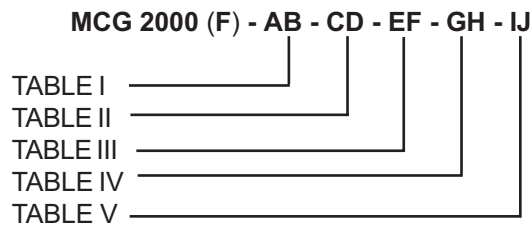
*All designs subject to change. Certified dimensions and specifications available upon request.*

### MCG 2000SFI ENCODER / TRANSMITTER

Includes: Online Program Updates (Flash Memory),  
Wireless Infrared Programming, 2 Discretes for  
Independent HI Alarms, Lightning Protection, Digital  
Output Using 4-Wire Data Highway, Absolute Optical  
Encoding, Local Display

### MODEL NUMBER SELECTION:

The model number will have a base number, **MCG 2000F** (for the MCG 2000SFI), and followed by 10 digits. These digits will represent 5 option tables.



### TABLE I - COUPLING / APPROVAL

- A**
- 0 - Standard coupling/UL or CSA approved
  - 1 - Standard coupling/CENELEC/ATEX approved
  - 2 - Metric coupling/UL or CSA approved
  - 3 - Metric coupling/CENELEC/ATEX approved
  - 9 - No encoder
- B**
- 1 - Varec
  - 2 - GPE (92020, 92021, 92030)
  - 3 - GPE (92006, 92153, 92154)
  - 4 - GPE (8000, 2935)
  - 5 - Protectoseal
  - 6 - Varec (9504) No Housing
  - 7 - Varec - (1600, 1800, 1900) No Housing
  - 8 - Special
  - 9 - GPE No Housing
  - A - GSI 2500

#### TABLE II - INPUTS AND TEMPERATURE

<b>CD</b>	
<b>00</b>	- None
<b>02</b>	- Average Temperature*
<b>03</b>	- (Reserved)
<b>05</b>	- 4-20mA Input (non-isolated)
<b>10</b>	- GPE 31422, 31423, TP 600
<b>11</b>	- Spot Temperature
<b>14</b>	- Spot Temperature w/ Barriers
<b>17</b>	- 4-20mA with Spot Temperature
<b>36</b>	- 4-20mA with Average Temperature*

*Calibration Type (Pl or Cu) is software-selectable in this model. The default is Platinum.  
\*Requires MCG 2350 Average Temperature and a MCG 350/351 Average Temperature bulb (Ordered Separately)*

#### TABLE III - SWITCHES

<b>EF</b>	
<b>00</b>	- None
<b>01</b>	- Two CAM Switches
<b>02</b>	- Three CAM Switches
<b>03</b>	- Four CAM Switches
<b>04</b>	- Five CAM Switches
<b>05</b>	- Six CAM Switches
<b>11</b>	- Two CAM Switches (DPDT)
<b>12</b>	- Three CAM Switches (TPDT)
<b>13</b>	- Reserved
<b>20</b>	- 2 Relays, 1 Amp @ 125 VAC (alarm relay) (Hi & HiHi only)
<b>21</b>	- 4 Relays, 1 Amp @ 125 VAC (alarm relay) (Lo, LoLo, Hi, HiHi)

#### TABLE IV - OUTPUT

<b>GH</b>	
<b>00</b>	- L&J Tankway
<b>01</b>	- 4-20mA Output in Place of L&J Tankway
<b>02</b>	- L&J Tankway and 4-20mA Output
<b>03</b>	- L&J Tankway and Ground Level Display
<b>04</b>	- Parallel Output in Place of L&J Tankway
<b>06</b>	- 4-20mA Level and 4-20mA Temp
<b>07</b>	- L&J Tankway and Parallel
<b>08</b>	- Varec 1800, 1900 (4-Wire, 1/2 Duplex)
<b>09</b>	- Varec 1600, (20 Wire Matrix)
<b>10</b>	- GPE 31422, 31423 Protocols
<b>11</b>	- Honeywell CLM Mod Buss on L&J Tankway
<b>12</b>	- RGL/NMC Interface
<b>13</b>	- 4-20mA and Ground Level Display
<b>14</b>	- Honeywell CLM Mod Buss on 485 Highway
<b>15</b>	- Enraf Interface
<b>16</b>	- Varec (HART Bus) 4100MFT
<b>17</b>	- Varec (HART Bus) and 4-20mA Output
<b>20</b>	- 4-20mA Output and Mod Buss on 485 Highway
<b>29</b>	- TI (Ti-Way) Protocol
<b>30</b>	- TI (CIM) Protocol
<b>40</b>	- GSI Protocol (RS485)
<b>XX</b>	- Special Protocols and emulations available

#### TABLE V- CONTROL POINTS/POWER

<b>I</b>	
<b>0</b>	- 48 VDC Standard L&J Tankway
<b>1</b>	- 24 VDC
<b>2</b>	- 48 VAC
<b>3</b>	- 110 VAC
<b>4</b>	- 220 VAC
<b>5</b>	- 65 VAC
<b>J</b>	
<b>0</b>	- None (2 Discrete Ins, Standard)
<b>1</b>	- One Pump or Valve (2 Relays, 2 DI's & 2 DO's)
<b>2</b>	- Two Points (1 Pump/1 Valve; or 2 Pumps or 2 Valves) (4 Relays, 4 Discrete Ins)
<b>3</b>	- Four Points (8 Relays, 8 Discrete Ins)

Note: For ease of installation, the following may be desired:

MCG 2100 Field Calibrator  
MCG 2150 Hand-Held Calibrator  
MCG 2151 PDA

### MCG 2000SFI UPGRADE KITS

These kits permit L&J Engineering customers to upgrade their transmitter technology to the new Smart Flash Infrared, or SFI, technology. The upgrade kit varies depending upon the existing transmitter model as described below: The following is for L&J Tankway, level, and Spot Temp. For any other configurations consult factory i.e. 4-20MA out. All upgrades will require an MCG 2150 to program the SFI in the field.



<u>PART NO.</u>	<u>DESCRIPTION</u>
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<b>810915</b>	<p><b>MCG 2000SS/2000SSI to MCG 2000SFI (Reuse Existing Dome)</b></p> <p>This kit consists of a new MCG 2000 SFI CPU PCB with new LCD Display. The upgrade from MCG 2000SS/SSI entails merely swapping out the old electronics with the new SFI electronics.</p> <p>Note: For the 2000 SS upgrade, the existing dome is re-used but does not have a glass portal to permit the infrared functions to be used while the dome is in place. All of the other SFI functions are enabled with the dome in place. Reuse existing optical encoder.</p>
<b>810962</b>	<p>Same as above, but includes optical encoder.</p>
<b>810959</b>	<p><b>MCG 2000SS to MCG 2000SFI - NEW DOME WITH GLASS PORTAL</b></p> <p>This kit includes a new MCG 2000 SFI CPU PCB with new LCD display and a new dome with a glass portal. The upgrade from MCG 2000SS entails merely swapping out the old electronics with the new SFI electronics. A new dome is provided with a glass portal to permit the infrared functions to be used while the dome is in place. Consult factory for transmitters purchased prior to 1987. Reuse existing optical encoder.</p>
<b>810960</b>	<p><b>MCG 2000SFI UPGRADE UTILIZING EXISTING GPE 31422/31423 HOUSING</b></p> <p>This kit includes new MCG 2000 SFI CPU PCB with new LCD display along with all necessary hardware to upgrade existing GPE transmitters to SFI technology. Existing GPE transmitter PCB's and potentiometers are replaced with 2000 SFI CPU, LCD display and absolute optical encoder all in customers existing GPE transmitter housing.</p> <p><b>MCG 2000SFI UPGRADE USING EXISTING OPTICAL ENCODER (Includes new housing)</b></p> <p>This kit includes all components of MCG 2000 SFI transmitters except the optical encoder. Kit contains new MCG 2000 SFI housing with glass portal dome as well as new 2000 SFI CPU PCB, LCD display, condulet PCB and cable. Customer will use optical encoder from existing L &amp; J transmitter.</p>



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