

**Instruction Manual  
For  
Guided Wave radar  
Type level Transmitter  
Model No.: ELGWR 40**

Authorised Dealer



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## **INTRODUCTION**

ELGWR 40-40 is a four wire TDR sensor with single rod or coaxial probe for continuous level measurement and point level detection in liquids with analog & switching output. The single rod is suitable for a very wide range of applications and liquids, but the signal has a wider detection radius around the rod. Thus it is more responsive for measurement signal disturbances and it has few mounting restrictions. In any case the single rod probe should never get in direct contact with the tank/nozzle wall or other objects in the tank.

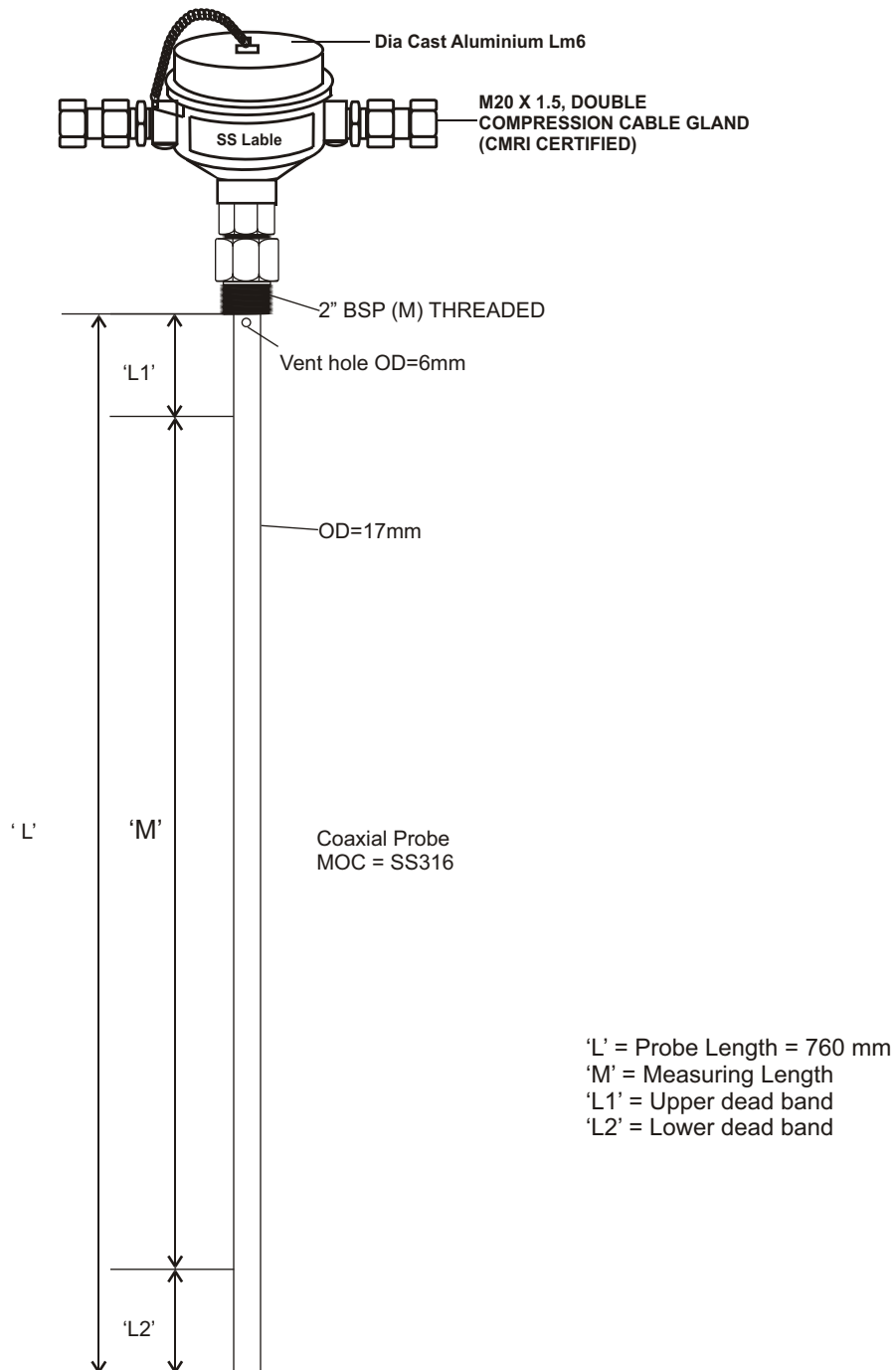
The coaxial probe does not have restrictions regarding mounting position, tank connection, proximity to the tank wall or other objects inside the tank.

The coaxial probe is recommended for installing into a non-metallic tank or open pit.

## **TECHNICAL SPECIFICATIONS**

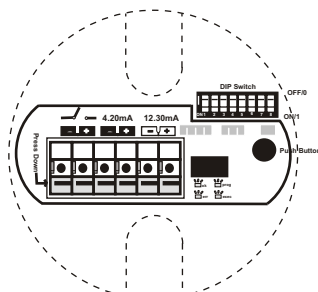
<b>INSTRUMENT NAME</b>	: GUIDED WAVE RADAR TYPE LEVEL TRANSMITTER
<b>MODEL NO.</b>	: ELGWR 40
<b>SR. NO.</b>	: -----
<b>INPUT</b>	: Change in level
<b>MEASURING RANGE (M)</b>	: Probe Length (L) less both inactive area at top and bottom (L1+L2)
<b>SWITCHING POINT (S)</b>	: Freely positionable within the measuring range (M)
<b>ANALOG OUTPUT</b>	: Current output, 4 - 20 mA DC corresponds to 0 - 100% of measuring range.
<b>SWITCHING OUTPUT DC PNP (ACTIVE)</b>	: NC or NO (Load current < 200mA)
<b>LOAD RESISTANCE</b>	: Less than 500W
<b>SUPPLY VOLTAGE</b>	: 12 - 30V DC
<b>CURRENT CONSUMPTION</b>	: Less than 70mA at 24V DC
<b>RESPONSE TIME</b>	: 0.5S (default), 2S, 5S (Selectable)
<b>START UP TIME</b>	: Less than 6S
<b>TERMINATION</b>	: 2 Nos. M20 x1.5 Double Compression Cable Gland
<b>ACCURACY</b>	: +/- 3mm
<b>REPEATABILITY</b>	: Less Than 2mm
<b>PROBE TYPE</b>	: Coaxial OD= 17mm
<b>PROBE LENGTH</b>	: 760 mm
<b>MATERIAL OF CONSTRUCTION</b>	: SS 316
<b>INACTIVE AREA TOP</b>	: Approx. 50mm
<b>INACTIVE AREA BOTTOM</b>	: Approx. 10mm
<b>ENCLOSURE MATERIAL</b>	: Die. Cast Aluminium
<b>PROCESS TEMPERATURE</b>	: 0 TO 150°C
<b>PROCESS PRESSURE</b>	: -1 to 30 bar

**FRONT VIEW**

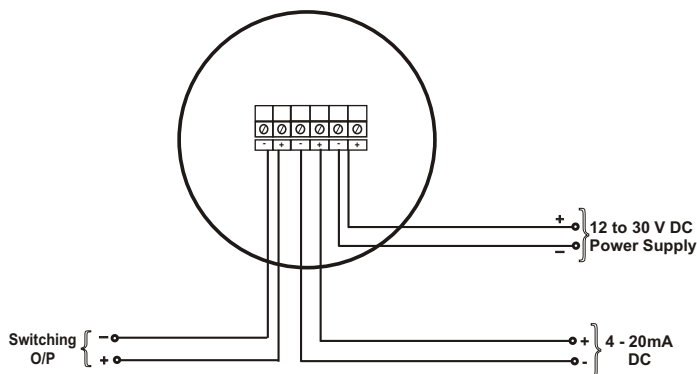


## INTERNAL DETAILS

### INTERNAL VIEW



### TERMINATION DETAILS



## OPERATION AND CONTROLLING

- A) Wiring: For wiring into the green screw less cage clamp terminal block simply press an orange lever straight down with a small flat tip screwdriver, insert a stripped wire end into the terminal hole and release the orange lever, the wire is now connected.
- B) Power ON: Switch on the power supply for the sensor LED should start blinking green within 6 seconds after connecting the power. (During this start up time the LED is off). The blinking green LED indicates that the sensor is in measuring mode and working correctly.
- C) Control elements: The ELGWR 40 can be configuration using three control elements :- A DIP Switch, a single push button and a LED for visual feedback. The DIP switch has eight small white levers. The upper position of the levers is OFF/0 and lower position is ON/1.  
The dip switches divided into three groups: Red, Blue & Gray
- (i) Red: DIP switch position 8 which switches between measuring and configuration mode. If switch 8 is ON/1 then only ELGWR 40 can be blinking alternately green and red. When DIP switch positions 8 is OFF/0, ELGWR 40 is in measuring mode ; indicated by the LED blinking green. It is only possible to enter the configuration mode when DIP switch positions 1 to 7 are OFF/0 before setting DIP switch position 8 to ON/1; otherwise the LED is blinking red to indicate an error.
  - (ii) Blue: Indicates the DIP positions through which groups of functions are selected, e.g. all functions related to the analog current output or the switching output.
  - (iii) Gray: Indicates the DIP positions through which individual functions/configuration settings selected.

## DIP SWITCH SETTING

DIP SWITCH POSITION											
1	2	3	4	5	6	7	8				
DIP SWITCH SETTINGS				DESCRIPTION							
0	0	0	0	0	0	0	0	Measuring Mode			
0	0	0	0	0	0	0	1	Configuration Mode			
FUNCTION GROUP 1				ANALOG CURRENT OUTPUT							
0	0	0	1	0	0	1	1	Lower Range Value (4mA), span 0%			
0	0	1	0					Upper Range Value (20mA), span 100%			
0	1	0	0					Response time 0.5s (default)			
0	1	0	1					Response time 2s			
0	1	1	0					Response time 5s			
FUNCTION GROUP 2				SWITCHING OUTPUT							
0	0	1	0	0	1	0	1	Lower Threshold			
0	0	1	1					Upper Threshold			
0	1	0	0					NC			
0	1	0	1					NO			
FUNCTION GROUP 3				DISTURBANCE SIGNAL SUPPRESSION							
0	0	0	1	0	1	1	1	Perform disturbance signal scan			
0	0	1	0					disturbance signal scan utilize (default)			
0	0	1	1					disturbance signal scan do not utilize			
0	1	0	0					Upper dead band : short (default) single rod probe 30mm <sup>1</sup> coaxial probe 0mm <sup>1</sup>			
0	1	0	1					Upper dead band : medium single rod probe 190mm <sup>1</sup> coaxial probe 160mm <sup>1</sup>			
0	1	1	0					Upper dead band : long single rod probe 390mm <sup>1</sup> coaxial probe 360mm <sup>1</sup>			
1	0	0	0					Amplitude Threshold: low (default)			
1	0	0	1					Amplitude Threshold: medium			
1	0	1	0					Amplitude Threshold: high			
1	1	0	0					Coaxial Probe			
1	1	0	1					Single rod probe			
FUNCTION GROUP 4								RESET			
0	0	0	1					1	0	0	1
FUNCTION GROUP 5				MEASURE PROBE LENGTH							
0	0	0	1	1	0	1	1	Measure Probe Length			

<sup>1</sup> always measured from the reference point: sealing surface of the connection thread (see dimensional drawings)

**NOTE:** After setting all DIP switch positions to represent the 0/1 sequence of the desired function, the push button has to be pressed to execute the desired function. Execution of the function is indicated by the LED remaining green until the function has been properly executed, in which case the LED returns to blinking alternately green & red

## CONFIGURATION / CALIBRATION

### CONFIGURATION OF SINGLE ROD PROBE

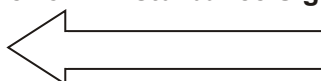
For most applications, executing the three basic configuration steps below is sufficient to achieve a fully functional sensor, providing a continuous level measurement through its analog current output.

#### 1. PERFORM DISTURBANCE SIGNAL SCAN

- \* ELGWR 40 has to be mounted in its final position and the tank has to be completely empty in order to perform a disturbance signal scan.
- \* Set the DIP switch positions to the 0/1 sequence as shown in Fig.1 on the left;  
**start from position 8 and move towards position 1!**
- \* LED will blink alternately green and red.
- \* Press the push button.
- \* LED will remain green for a few seconds while the disturbance signal scan is being performed.
- \* Once the scan is completed successfully, the LED will return to blinking alternately green and red.

DIP SWITCH POSITION								DESCRIPTION
1	2	3	4	5	6	7	8	
0	0	0	1	0	1	1	1	Perform Disturbance Signal Scan

**Fig. 1 Perform Disturbance Signal Scan**



#### 2. LOWER RANGE VALUE [4mA]; SPAN 0%

- \* Fill the liquid into the tank up to the level where you want to position the lower range value [4mA]; span 0%. It is recommended that the lower range value stays within the measuring range [M].
- \* Change DIP switch position 6 to off/0 as shown in Fig.2.
- \* Press the push button.
- \* LED will remain green briefly while the lower range value setting is being executed
- \* Once it has been executed successfully, the LED will return to blinking alternately green and red.

DIP SWITCH POSITION								DESCRIPTION
1	2	3	4	5	6	7	8	
0	0	0	1	0	0	1	1	Lower range value [4ma]; span 0%

**Fig. 2 Lower Range Value [4mA]; Span 0%**

## CONFIGURATION OF SINGLE ROD PROBE

### 3. UPPER RANGE VALUE [20mA]; SPAN 100%

- \* Raise the liquid inside the tank up to the level where you want to position the upper range value [20mA]; span 100%.
- \* It is recommended that the upper range value stays within the measuring range [M].
- \* Change DIP switch position 3 to on/1 & DIP switch position 4 to off/0 as shown in Fig.3.
- \* Press the push button.
- \* LED will remain green briefly while the upper range value setting is being executed.
- \* Once it has been executed successfully, the LED will return to blinking alternately green and red.

DIP SWITCH POSITION								DESCRIPTION
1	2	3	4	5	6	7	8	
0	0	1	0	0	0	1	1	Upper range value [20ma]; span 100%

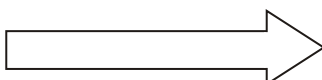
**Fig. 3 Upper Range Value [20mA]; Span 100%**

### 4. MEASURING MODE

- \* Set all the DIP switch positions to 0 as indicated in Fig. 4 on the left; **start from position 1 and move towards position 8!**
- \* The LED will change to blinking green.

DIP SWITCH POSITION								DESCRIPTION
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	0	0	Measuring Mode

**Fig. 4 Measuring Mode**



## CONFIGURATION OF COAXIAL PROBE

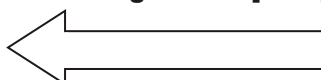
The coaxial probe has a very robust & reliable measurement performance in almost any application without further configuration. For basic configuration only the range for the analog current output have to be set.

### 1. LOWER RANGE VALUE [4mA]; SPAN 0%

- \* Set the DIP switch position to the 0/1 sequence in Fig. 5 on the left; **start from position 8 & move towards position 1!**
- \* Fill the liquid into the tank up to the level where you want to position the lower range value [4mA]; span 0%. It is recommended that the lower range value stays within the measuring range [M].
- \* Press the push button.
- \* LED will remain green briefly while the lower range value setting is being executed
- \* Once it has been executed successfully, the LED will return to blinking alternately green and red.

DIP SWITCH POSITION								
1	2	3	4	5	6	7	8	
DIP SWITCH POSITION								DESCRIPTION
0	0	0	1	0	0	1	1	Lower range value [4ma]; span 0%

**Fig. 5 Lower Range Value [4mA]; Span 0%**



### 2. UPPER RANGE VALUE [20mA]; SPAN 100%

- \* Raise the liquid inside the tank up to the level where you want to position the upper range value [20mA]; span 100%.
- \* It is recommended that the upper range value stays within the measuring range [M].
- \* Change DIP switch position 3 to on/1.
- \* Press the push button.
- \* LED will remain green briefly while the upper range value setting is being executed.
- \* Once it has been executed successfully, the LED will return to blinking alternately green and red.

DIP SWITCH POSITION								
1	2	3	4	5	6	7	8	
DIP SWITCH POSITION								DESCRIPTION
0	0	1	0	0	0	1	1	Upper range value [20ma]; span 100%

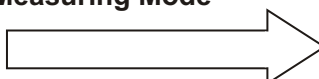
**Fig. 6 Upper Range Value [20mA]; Span 100%**

### 3. MEASURING MODE

- \* Set all the DIP switch positions to 0 as indicated in Fig. 7 on the left; **start from position 1 and move towards position 8!**
- \* The LED will change to blinking green.

DIP SWITCH POSITION								
1	2	3	4	5	6	7	8	
DIP SWITCH POSITION								DESCRIPTION
0	0	0	0	0	0	0	0	Measuring Mode

**Fig. 7 Measuring Mode**





## CONFIGURATION OF SWITCHING OUTPUT

Switching output freely positionable within the measuring range (M) hysteresis can be set by defining separate upper & lower thresholds; if those are set at the same position the min. Hysteresis of 3mm applies.

### 1. LOWER THRESHOLD SETTING:

- \* Fill the liquid into the tank up to the level where you want to position the lower threshold.
- \* It is recommended that the lower threshold stays within the measuring range (M).
- \* Change DIP switch position as shown in fig.8 below.
- \* Press the push button.
- \* LED will remain green briefly while the lower threshold setting is being executed.
- \* Once it has been executed successfully, the LED will return to blinking alternately green and red.

DIP SWITCH POSITION								
1	2	3	4	5	6	7	8	
DIP SWITCH POSITION								DESCRIPTION
0	0	1	0	0	1	0	1	Lower Threshold Setting

**Fig. 8 Lower Threshold Setting**

### 2. UPPER THRESHOLD SETTING:

- \* raise the liquid into the tank up to the level where you want to position the upper threshold.
- \* It is recommended that the upper threshold stays within the measuring range (M).
- \* Change DIP switch position as shown in fig.9 below.
- \* Press the push button.
- \* LED will remain green briefly while the upper threshold setting is being executed.
- \* Once it has been executed successfully, the LED will return to blinking alternately green and red.
- \* Set all the DIP switch positions to 0 as indicated in figure 9 on the left below ; start from position 1 and move towards position 8.
- \* The LED will change to blinking green.

DIP SWITCH POSITION								
1	2	3	4	5	6	7	8	
DIP SWITCH POSITION								DESCRIPTION
0	0	1	1	0	1	0	1	Upper Threshold Setting

**Fig.9 Upper Threshold Setting**

## DOS & DON'TS FOR USER

### General mishandling on site :-

1. Loose connection on terminations.
2. Incorrect calibration.
3. Incorrect loop connection between transmitter & indicator.

### Precautions to be taken on site :-

1. Read the instruction manual carefully before installing the instrument.
2. Do the connections as per loop diagram given in manual.
3. Terminal connections should be tight.
4. Check for proper supply voltage . It should be between 12 to 30 VDC.
5. During calibration follow the steps mentioned in the manual. **Calibration should be done by authorized person only.**

## TROUBLESHOOTING PROCEDURE FAULT ANALYSIS

### SYMPTOMS

.1 No current output.

### CAUSE OF FAILURE

1. Absence of 24 V DC.
2. Loose connection on termination.
3. Incorrect loop connections.
4. Power Supply connected with reverse polarity

### ACTION TO BE TAKEN

1. Check 24 V DC connections & rectify the fault.
2. Tight the termination connections.
3. Check for loop connections as per loop diagram given in manual.
4. Check for polarity of the power supply

2. Incorrect current output.

1. Loose connection on terminations.
2. Incorrect calibration.
3. Level of liquid not within measuring range(M)

1. Tight the input terminal connections & rectify the fault.
2. Recalibrate the instrument. Refer calibration procedure.
3. Check liquid level it should be within range.

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