FG-D

WEIGHING INDICATOR

SETUP INSTRUCTIONS

WEIGHING INDICATOR

MODEL

FG-D

CE

A&D Company, Limited

1288-1A-IE

INTRODUCTION

The FG-D Digital indicator is used in the construction of high performance scales. It has the same specifications as the indicator used on FG Series platform scales. While there may be limitations in interfacing the FG-D indicator to some load cells, such as,

1. One 350 ohm type load cell can be used.
2. The load cell cable should be within 5 m long (no remote sensing).
3. Fixed capacities and minimum divisions can be selected.

But the indicator is a quality component for use with most platform scale designs, and FG series options can be used for more applications —— RS-232C serial interface, wall mounting kit and AC adapter

This manual describes how to connect a weighing platform only.

Please refer to the enclosed FG series instruction manual for operating instructions.

UNPACKING

Enclosed in each FG-D shipping carton:

- ◇ Display Unit
- ◇ 7 pin connector wire
- ◇ FG Series platform scale instruction manual
- ◇ Setup manual (this manual)

CAPACITY & MINIMUM DIVISION

Select capacity from Function Parameter Settings procedure on page 4.

Minimum division (scale interval) is pre-set, and corresponds to the selected capacity.

FUNCTION PARAMETER	CAPACITY × MIN.DIV Kg	CAPACITY × MIN.DIV lb
CF4= 0	20.00 kg × 0.01 kg	40.00 lb × 0.02 lb
1	30.00 kg × 0.01 kg	60.00 lb × 0.02 lb
2	31.00 kg × 0.01 kg	60.00 lb × 0.02 lb
3	60.00 kg × 0.02 kg	150.00 lb × 0.05 lb
4	150.00 kg × 0.05 kg	300.0 lb × 0.1 lb
5	200.00 kg × 0.05 kg	400.0 lb × 0.1 lb
6	300.00 kg × 0.05 kg	600.0 lb × 0.1 lb
7	310.00 kg × 0.05 kg	600.0 lb × 0.1 lb
8	60.00 kg × 0.01 kg	150.00 lb × 0.02 lb
9	150.00 kg × 0.02 kg	300.00 lb × 0.05 lb
A (Dual Range)	20.00 kg × 0.01 kg 10.000kg × 0.005 kg	40.00 lb × 0.02 lb 20.00 lb × 0.01 lb
b (Dual Range)	30.00 kg × 0.01 kg 15.000 kg × 0.005 kg	60.00 lb × 0.02 lb 30.00 lb × 0.01 lb
C (Dual Range)	31.00 kg × 0.01 kg 15.000 kg × 0.005 kg	60.00 lb × 0.02 lb 30.00 lb × 0.01 lb
d (Dual Range)	60.00 kg × 0.02 kg 30.00 kg × 0.01 kg	150.00 lb × 0.05 lb 60.00 lb × 0.02 lb
E (Dual Range)	150.00 kg × 0.05 kg 60.00 kg × 0.02 kg	300.0 lb × 0.1 lb 150.00 lb × 0.05 lb

The above table shows when the function CF3 is set to 2 or A.

SPECIFICATIONS

1) Load Cell Excitation	5V±10%
2) Load Cell Capability	1 Load Cell (350 ohm)
3) Input Signal Range	
Zero Input Voltage	≧0.5mV
Full Input Voltage	≦ 15mV
Input Sensitivity	≧0.5μV/d
	d = "min. division" or "scale interval"
4)Temperature Coefficient (-5℃~35℃)	
Zero :	±(0.3μV+0.0008% of dead load)/℃ (typ.)
Span :	±0.0008%/℃ of reading (typ.)
5) Non-linearity	0.03% of full scale
6) Input Impedance	10MΩ
7) A/D Conversion Method	Integration Type
8) A/D Conversion Rate	Appox. 5 times/second
9) Power Requirements	DC9V ('A' size batteries×6) (not included) or
	AC adapter (option) AC100~120V type / AC200~240V type
	50/60Hz (Output should be 6V to 12V DC max.)
10)Operating Temperature	-10℃~40℃

LOAD CELL CONNECTION

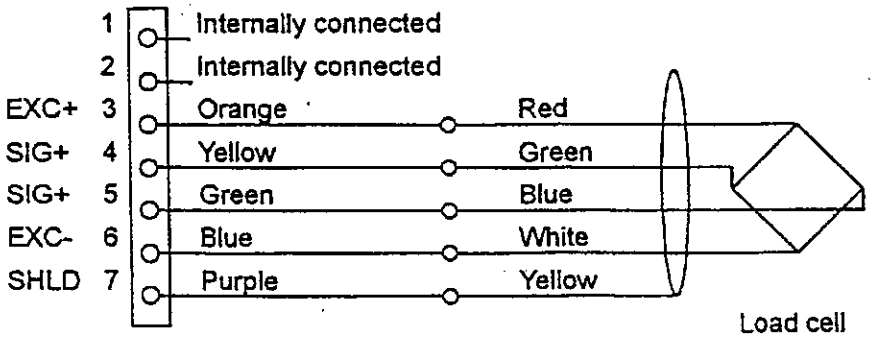
◇ Use a four wire cable with shield as a load cell cable.

◇ The analog output from the Load Cell and RS-232C signals are sensitive to electrical noise. Do not bind these cables together as it could result in cross-talk interference. Please also keep them away from AC power cables.

1) LOAD CELL CABLE CONNECTION

Load Cell Connections

Pin No.	Signal	
1	Internally connected	
2	Internally connected	
3	Positive Excitation Voltage	(EXC+)
4	Positive Signal Voltage	(SIG+)
5	Negative Signal Voltage	(SIG-)
6	Negative Excitation Voltage	(EXC-)
7	Shield	(SHLD)

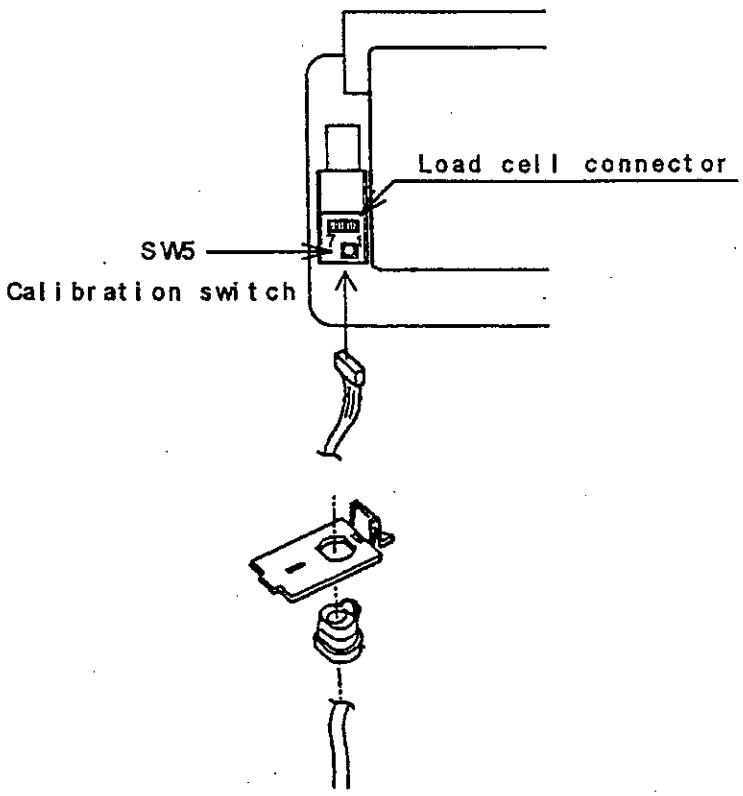


7 pin connector wire

Connect the 7 pin connector wire with load cell cable. Be sure not to short the connecting points each other.

2) CONNECTING THE LOAD CELL CABLE TO THE INDICATOR

Thread the load cell cable through a cable clamp and a calibration switch cover, and connect it to the main board.



3) EXAMPLE OF LOAD CELL APPLICATION

LOAD CELL CAPACITY	100kg	: A
RATED OUTPUT	2mV/V	: B
MAX. CAPACITY of PLATFORM	60kg	: C
MIN. DIVISION of DISPLAY	0.02kg	: d
EXCITATION VOLTAGE	5V	: E
DEAD LOAD(ZERO OFFSET)	20kg	: F

①Zero Input Voltage

=B×E×(F/A)=2(mV/V)×5(V)×{20(kg)/100(kg)}=2mV>0.5mV·····OK

②Full Input Voltage

=B×E×(C+F)/A=2(mV/V)×5(V)×{60(kg)+20(kg)}/100(kg)=8mV<15mV·····OK

③Input Sensitivity

=B×E×1000×(C/A)×(d/C)

=2(mV/V)×5(V)×1000×{60(kg)/100(kg)}×{0.02(kg)/60(kg)}

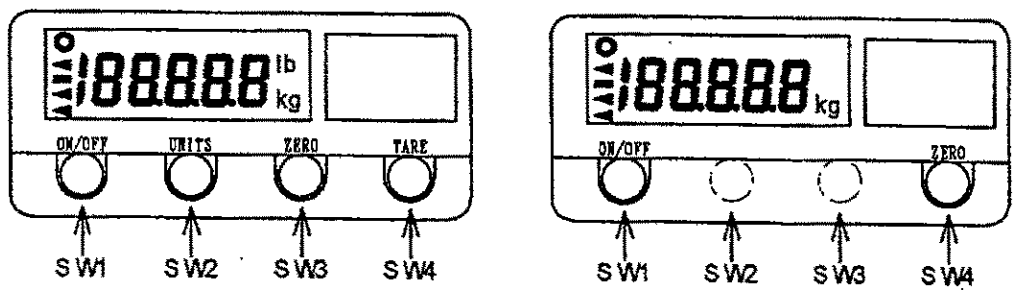
=2μV>0.5μV·····OK

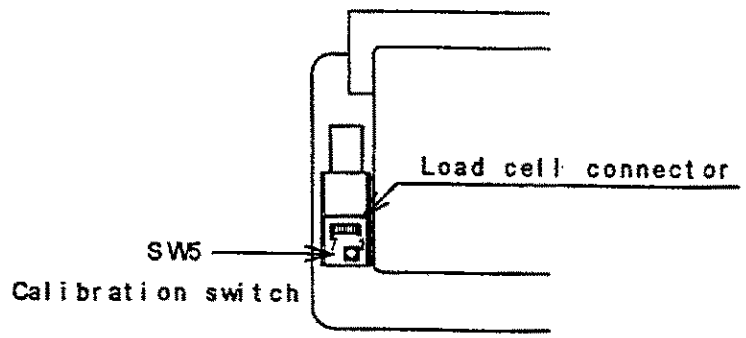
FUNCTION PARAMETER SETTINGS

This section describes the selection of capacity and some functions.

Be sure to set the weighing unit (CF2), the decimal position (CF3) and the capacity (CF4) according to the specifications of the platform used. If necessary, set the other function parameters as well.

1).FUNCTION PARAMETER SETTINGS PROCEDURE





NOTE: DESCRIPTION OF KEYS

SW2 sets a decrement of value.

SW3 sets a increment of value.

SW4 stores a displayed setting value into the memory and proceeds to next step.

SW5 proceeds to the next setting without changing the memory.

1) ENTERING THE FUNCTION PARAMETER SETTINGS PROCEDURE

① Press and hold SW4 and SW5. While holding the SW4 and SW5, press SW1 to turn the power on.

☞ CF 1 0 or CF 1 1 is displayed.

2) SETTING THE TYPE OF KEY FUNCTION

① Select CF 1 0 or CF 1 1 using SW2 and SW3.

CF 1 0 ON/OFF and ZERO are available.

CF 1 1 ON/OFF, UNITS, ZERO and TARE are available.

If you don't have to change the setting, then press SW5 to go to CF 2 procedure.

② Press SW4 to store the setting data.

☞ CF2 0 ~ CF2 6 are displayed.

3) SELECTING THE WEIGHING UNIT ACCORDING TO THE COUNTRIES

① Select CF 2 setting using SW2 and SW3.

CF2 0 kg, old metric type. TARE doesn't meet the OIML.

CF2 1 lb and kg, for the non-metric countries. TARE doesn't meet the OIML.

CF2 2 kg, based on the OIML for the most of countries.

CF2 3 kg, based on the OIML. But TARE works even the display shows zero.

CF2 4 No use.

CF2 5 g, based on the OIML.

CF2 6 t, based on the OIML.

If you don't have to change the setting, then press SW5 to go to CF 3 procedure.

② Press SW4 to store the setting data.

☞ CF3 1 ~ CF3 A are displayed.

4) SETTING THE DECIMAL POINT

① Set CF 3 setting to fix the decimal point using SW2 and SW3.

CF 3 1 One decimal place, (0.0).

CF 3 2 Two decimal places, (0.0 0).

CF 3 9 One decimal place, (0,0)

CF 3 A Two decimal places, (0,0 0).

If you don't have to change the setting, then press SW5 to go to CF 4 procedure.

② Press SW4 to store the setting data..

☞ CF4 0 ~ CF3 E are displayed.

5) SETTING THE CAPACITY (RESOLUTION IS AUTOMATICALLY DECIDED)

① Set CF4 setting using SW2 and SW3 according to the specifications of the platform used. See ***CAPACITY & MINIMUM DIVISION*** on page 1 for the CF4 parameters.
If you don't have to change the setting, then press SW5 to go to CF5 procedure.

② Press SW4 to store the setting data.
☞ CF5 0 or CF5 1 is displayed.

6) SETTING THE ZERO TRACKING CONDITION

① Select the zero tracking condition CF5 using SW2 and SW3.

CF5 1 Approximately 0.25d / 1 sec. for the normal use.

CF5 2 Approximately 0.125d / 1.6 sec.

If you don't have to change the setting, then press SW5 to go to CF6 procedure.

② Press SW4 to store the setting data.
☞ CF6 0 or CF6 1 is displayed.

7) SETTING THE RS-232C FORMAT

① Select the RS-232C format CF6 using SW2 and SW3.

CF6 1 FG standard format. ST,+00000.00_kg$C_R L_F$.

CF6 2 FV/HV format. ST,+000.00kg$C_R L_F$.

If you don't have to change the setting, then press SW5 twice to go to F 1.

② Press SW4 to store the setting data and press SW5 to go to F 1.
☞ CF7 will be displayed before F 1, but this is not used for FG-D and any setting will be OK.

8) SETTING THE AUTOMATIC POWER-OFF FUNCTION

① Select the automatic power-off function F 1 using SW2 and SW3.

F1 1 Automatic power-off function disabled.

F1 2 Automatic power-off function enabled.

If you don't have to change the setting, then press SW5 twice to go to F2.

② Press SW4 to store the setting data.
☞ F2 0, F2 1 or F2 2 is displayed.

9) SETTING THE DATA COMMUNICATION MODE OF RS-232C

① Select the data communication mode of RS-232C using SW2 and SW3.

F2 0 STREAM mode. The data update rate is approximately 5 times / sec.

F2 1 COMMAND mode.

F2 2 No use (no data available).

If you don't have to change the setting, then press SW5.
☞ F3 will be displayed.

② Press SW4 to store the setting data.
☞ F3 will be displayed, but this is not used for FG-D and any setting will be OK.

10) THE END OF FUNCTION PARAMETER SETTINGS

Turn the display off by SW1 (ON/OFF).

Pressing SW5 at the above procedure, the other settings, CAL F etc. will be displayed. But these parameters were set at the factory. If you change these parameters, the indicator will not work correctly.

CALIBRATION

This section describes about the calibration procedure using calibration mass.

Be sure to set the weighing unit (CF2), the decimal position (CF3) and the capacity (CF4) before calibration.

In this calibration procedure, SW2 ~ SW5 are used as follows.

SW2 selects a blinking digit that can be changed by SW3..

SW3 increments the value of blinking digit.

SW4 stores a displayed setting value into the memory and proceeds to the next setting.

SW5 proceeds to the next setting without changing the memory.

1) ENTERING CALIBRATION PROCEDURE

① Warm up the scale for at least 10 minutes before calibration. Be careful of automatic power-off function, which should be disabled by F 1 or by placing something on the weighing pan not show zero.

② With the display on, press and the calibration switch SW5.

☞ 9.798 or some other value will be displayed. This is the gravity value 'g'.

2) GRAVITY SETTING

① If the scale will be used at same area where the calibration is done, or the scale will be calibrated at user's location, then you don't have to set the gravity value. Press SW5 to go to CAL 0.

② Set the gravity value for your location using SW2 and SW3. If you don't know the value, refer to the GRAVITY TABLE at the back of this manual.

Press SW4.to store the value.

☞ CAL 0 will be displayed.

3) ZERO CALIBRATION

① Be sure that nothing is on the weighing pan, and wait until the stability indicator turns on.

② Press SW4.to memorize the zero data.

☞ CAL 1 will be displayed.

4) SPAN CALIBRATION

① Non-metric version can select CAL 1 or CAL 2 by pressing SW3.

CAL 1 Calibration in kilograms

CAL 2 Calibration in pounds

To return to CAL 1, press SW3 again while showing CAL 2.

② Press SW4 to display span calibration weight.

When using a weight that equal the displayed value, go to ⑤.

☞ 15.000 and so on will be displayed.

③ When using SW2 and SW3, set the value of calibration weight you use. Full span weight will be recommended and, if impossible, use a weight of at least 2/3 of the capacity.

④ Place a calibration weight equal to the displayed value and wait until the stability indicator turns on.

⑤ Press SW4.to memorize the span data.

☞ End will be displayed.

Note : If " -CAL E " is displayed when you press SW4, the calibration weight is too small compared with the value entered.

⑥ Press SW5 to return to the normal weighing operation.

5) ERROR MASSAGE

① Err 8 Data is not correctly stored in the memory. Turn the power off and retry the settings.

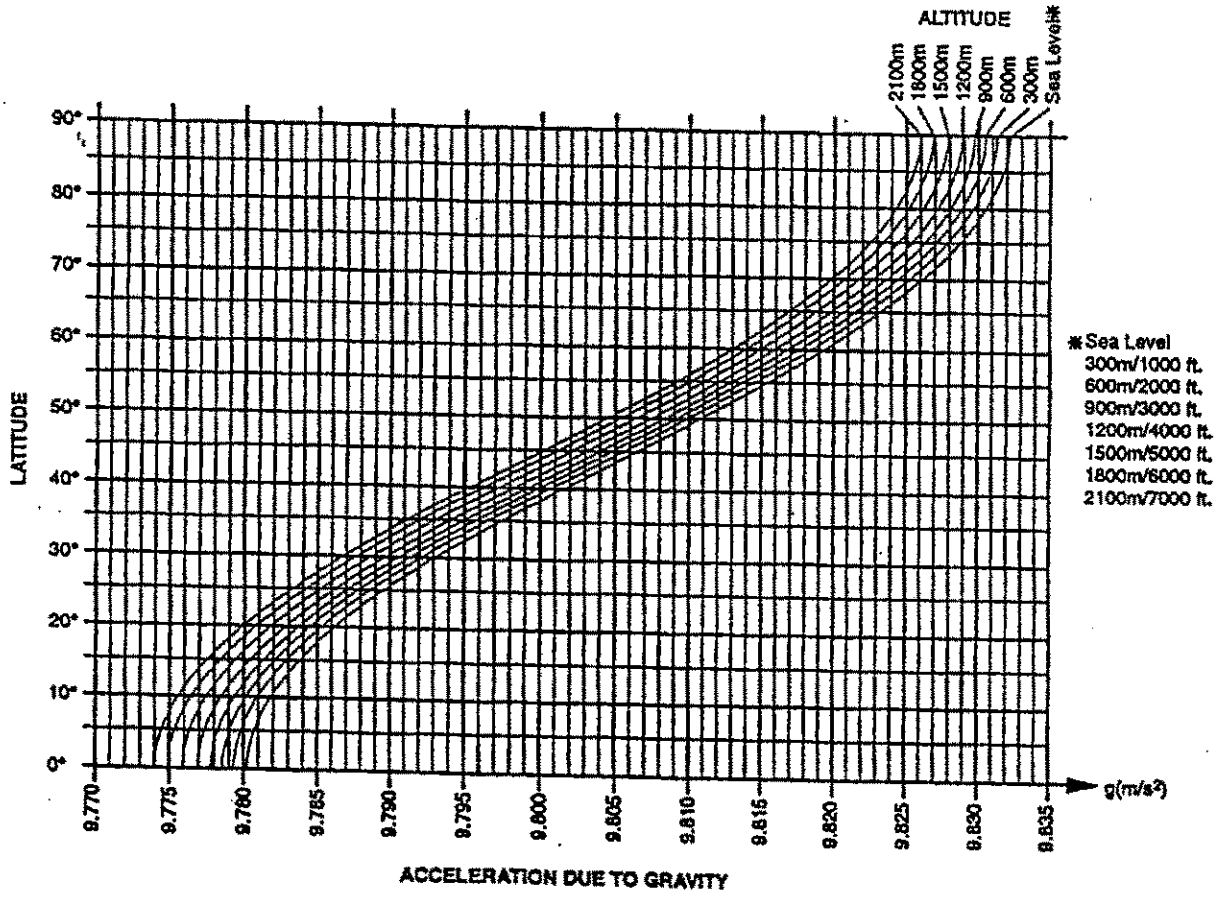
② CAL E The input from the load cell is too big.

③ -CAL E The input from the load cell is too small.

Gravity Values at Various Locations

Calcutta	9.788	m/s²	Paris	9.809	m/s²
Capetown	9.796	m/s²	Rio de Janeiro	9.788	m/s²
Chicago	9.803	m/s²	Rome	9.803	m/s²
Amsterdam	9.813	m/s²	Manila	9.784	m/s²
Athens	9.800	m/s²	Melbourne	9.800	m/s²
Auckland NZ	9.799	m/s²	Mexico City	9.779	m/s²
Bangkok	9.783	m/s²	Milan	9.806	m/s²
Birmingham	9.813	m/s²	New York	9.802	m/s²
Brussels	9.811	m/s²	Oslo	9.819	m/s²
Buenos Aires	9.797	m/s²	Ottawa	9.806	m/s²
Copenhagen	9.815	m/s²	San Francisco	9.800	m/s²
Cyprus	9.797	m/s²	Singapore	9.781	m/s²
Djakarta	9.781	m/s²	Stockholm	9.818	m/s²
Frankfurt	9.810	m/s²	Sydney	9.797	m/s²
Glasgow	9.816	m/s²	Taichung	9.789	m/s²
Havana	9.788	m/s²	Taiwan	9.788	m/s²
Helsinki	9.819	m/s²	Taipei	9.790	m/s²
Kuwait	9.793	m/s²	Tokyo	9.798	m/s²
Lisbon	9.801	m/s²	Vancouver, BC	9.809	m/s²
London (Greenwich)	9.812	m/s²	Washington DC	9.801	m/s²
Los Angeles	9.796	m/s²	Wellington NZ	9.803	m/s²
Madrid	9.800	m/s²	Zurich	9.807	m/s²

Acceleration Due to Gravity Table



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