

# TML ORIGINAL STRAIN MEASUREMENT

## 1-GAUGE 4-WIRE STRAIN MEASUREMENT METHOD

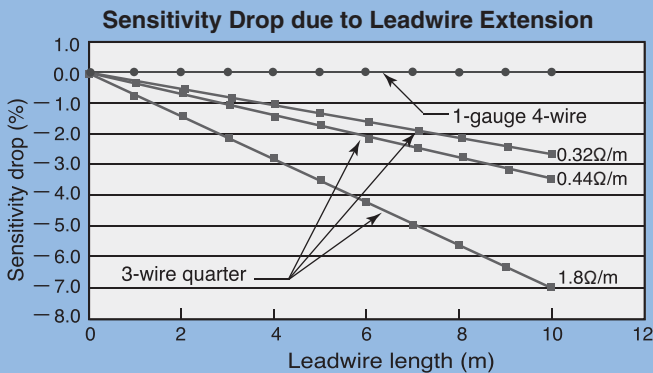
### General

For strain gauge measurement, various bridge configurations are employed according to the number of strain gauges to be used and measuring purpose. In quarter bridge configuration, three wire method is widely used to remove the effect of temperature to gauge leadwire resistance. However, some measuring error occurs owing to gauge factor correction due to leadwire resistance and variation in the contact resistance of connection part. Our developed 1-gauge 4-wire strain measurement method serves not to induce any measurement error ascribable to the gauge factor correction and contact resistance. (Japanese Patent No.3546203)

### FEATURES (Superiority to 3-wire quarter bridge method)

#### Leadwire Resistance

In conventional method, as bold and short leadwires as possible are recommended to keep the resistance of leadwires lower. On the contrary, as the 1-gauge 4-wire method is not influenced at all by the leadwire resistance, it is possible to connect a thin and long leadwires to strain gauges.

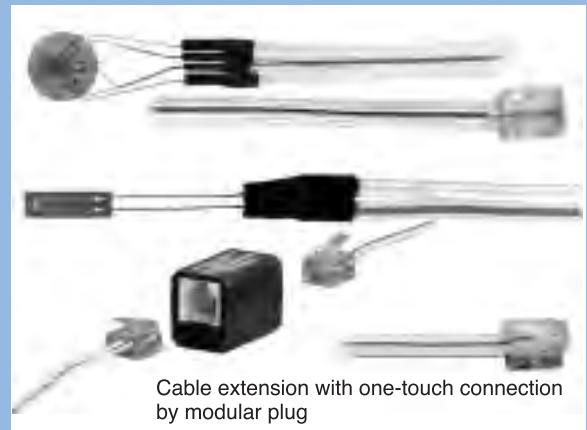


#### Contact resistance

In conventional method, leadwire extension and connection to a measuring instrument are done by soldering or the use of exclusive connector. As the 1-gauge 4-wire method is not affected at all by contact resistance, a modular plug can be used. Because the modular plug makes leadwire extension and connection to the instrument possible by merely plugging in, the efficiency of wiring work and prevention of wiring mistake are achieved and also RoHS-compliant lead free soldering is unnecessary.

#### Strain gauges with leadwires and modular plug

The strain gauges are used in our developed 1-gauge 4-wire strain measurement method (Patent No.3546203). Most of our strain gauges can be supplied with preattached leadwires and modular plug (RJ12). As a modular plug is attached to the end of the leadwires, soldering or screwing connection to a measuring instrument is unnecessary, but the instrument must be of TML make. The 4-wire leadwires are covered with polypropylene resin which does not generate noxious gas even if disposed by fire.



#### Single type

**4-wire palleled leadwire attached**  
 Applicable leadwire : 0.08mm<sup>2</sup> poly-propyrene with modular plug  
 Temperature range -20~+100°C

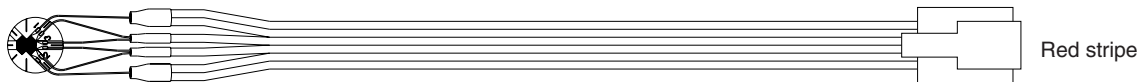
FLA-2-11- \_ LQM

## Rectangular 3-element type

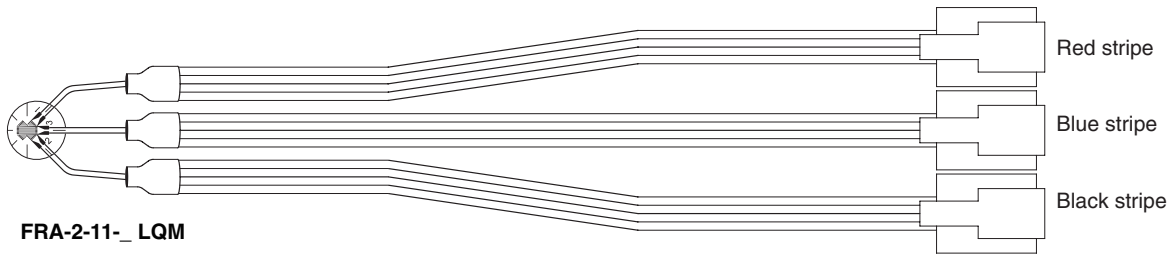
Ordinarily, leadwires are needed for individual gauge elements, but in the 1-gauge 4-wire method, one piece only of 6-wire parallel leadwires is used, and with TML exclusive switching box SSW-13R, connection for 3 channels can be completed with one modular plug only.

### Rectangular 3-element, 45° stacked rosette gauge

Applicable leadwire : 0.08mm<sup>2</sup> poly-propylene with modular plug  
Temperature range -20~+100°C



**FRA-2-11- LHM**



**FRA-2-11- LQM**

With TML data logger model TDS-530, 1-gauge 4-wire method is completed by merely connecting the modular plug to its built-in switching box and with TDS-602/TDS-303 data loggers to the exclusive external switching boxes. (Wiring-saved rosette gauges needs external switching box model SSW-13R regardless of the data loggers.) If TML high speed digital dynamic strainmeter model DRC-3410 is used, dynamic 1-gauge 4-wire strain measurement becomes possible.

## ■ 1-Gauge 4-Wire strain measurement system

1-Gauge 4-Wire system strain gauge



3-element rosette strain gauge  
[3-Gauge 6-Wire system strain gauge]



### Modular-plug integrated leadwires

Most of our strain gauges can be supplied with any lengths of leadwires with modular plug (RJ12). This makes wiring efficiently, prevents wiring mistake and reduces cost due to repeated use of the same leadwires.

### No contact resistance

1-gauge 4-wire strain measurement need not take contact resistance into account. Using commercial interconnection adapter, leadwire extension can be easily done.



### Static Strain Measurement

Data Logger

TDS-630  
TDS-530  
TDS-303



Switching Box

IHW-50G/ISW-50G  
SSW-50G  
SSW-10F/SSW-13R



For wiring-saved rosette gauges, confirm compatible model of switching box.

### Dynamic Strain Measurement

High Speed Digital Strainmeter  
DRC-3410

