Digital Force Gauge
ARF-series

OPERATION MANUAL

Attonic

ATTONIC CO., LTD

■Digital Force Gauge

It is the force-measuring instrument of the electronic formula which can measure both tension and compression power by single axis.Our design is for hand held use and can be set with load testing stand. By using with a test stand, it corresponds to a large area from the field of a quality control to the research and development. Digital Force Gauges are used well to check intensity or movement of some parts in automobile industry,electric industry and etc.

■Features

- ・Our Digital Force Gauge is down sized and has original design for hand held use.
- ・The display value can be displayed reversely.
- ・Sampling Speed 1ms
- ・The digital range of display is max. 9999.
- ・Digimatic, Analog, RS-232C and Comparator out-put are attached as standard accessory.

■Example Use

- ・Peak Holding Measurement and Tracking Measurement
- ・Peak Holding Memory is 50 Measurements Value.
- ・The limit of ＨＩ(HIGH) and ＬＯ(LOW) can be made by comparator out-put.
- ・Selectable 3 units (Ｎ、Kg ｆ、lbf)
- ・Battery Volume can be checked on display.
- ・Power auto-off function
  When there is no key 2-3minutes,a power supply is turned off automatically

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■Notes

⚠ Do not overload

The limit of overload capacity is 120% of full scale.
When the load is reached to 110% of Full Scale,
" OVERLOAD " is indicated on display.Keep it within
100% of Full Scale. This is the cause for the
breakdown of load sensor.

※In case of over load setting 1 ～ 100 %,
" OVER LOAD " will be indicated on display when the
load is reached over your setting value.
(Regarding over load setting, please see page No.9.)

⚠ Do not use other adapter

Should other adapter be used, there are possibility
to breakdown or may lead to a fire. Also, do not
charge or operate unit in other voltage.

⚠ Do not impact or damage unit

This is the cause for the breakdown of load sensor or
other troubles.

⚠ Do not store and operate in the following conditions
※ Wet area　　※ Where dew condensation
※ Dusty area　※ Where oil or chemicals

⚠ Do not disassemble, trouble-shoot and remodel

Should you perform any of these, that may cause
malfunction of the unit.

■Specifications

■Standard Specifications
- Measuring Unit : Selectable 3 units N/Kgf/lb f
- Accuracy : ±0.2% of F/S
- Measurement : Peak Holding / Tracking
- Peak Holding : Digital Peak Holding
- Peak Holding Memory : 50 Measurement Values
- Sampling Speed : 1ms
- Display : 4 digits LCD
- Over Load Capacity : 120%
- Auto Power Off Term : 3 minutes
- Attachment : Included 7 Attachments S-1 to S-7
- Net Weight : About 400 g
- Guarantee : 1 year
- Power Supply : Rechargeable Ni-MH Battery
             (Charging Time : About 4 hours)
- AC Adapter : input : AC100-AC240V、output : DC9V、500mA
- Out-Put : ①Digimatic out-put   ②RS-232C out-put
            ③Reset signal in-put ④Comparator out-put
            ⑤Over Load out-put   ⑥Analogue out-put (±1V)
  ＊Regarding the details for out-put, please refer page No.9.

■Model & Indication Range

Model	Measuring Range	Min. Indication
ＡＲＦ－０２	0-2.000N/0-200.0g/0-0.440lb	0.001N/0.1g/ 0.001lb
ＡＲＦ－０５	0-5.000N/0-500.0g/0-1.100lb	0.001N/0.1g/ 0.001lb
ＡＲＦ－１	0-9.999N/0-999.9g/0-2.200lb	0.001N/0.1g/ 0.001lb
ＡＲＦ－２	0-20.00N/0-2000g/0-4.400lb	0.01N/ 1g/ 0.001lb
ＡＲＦ－５	0-50.00N/0-5000g/0-11.00lb	0.01N/ 1g/ 0.01lb
ＡＲＦ－１０	0-99.99N/0-9999g/0-22.00lb	0.01N/ 1g/ 0.01lb
ＡＲＦ－２０	0-200.0N/0-20.00Kg/0-44.00lb	0.1N/ 0.01Kg/ 0.01lb
ＡＲＦ－５０	0-500.0N/0-50.00Kg/0-110.0lb	0.1N/ 0.01Kg/ 0.1lb

1 When the max. display indication of 5000 and 9999 (10000), the 1st digits of display is changeable.   The ability of sampling speed and resolution become high in these max. display.

2 In case of 100% to 110% of full scale of measuring range, the display indicate the measuring value. However this measuring value can not be used for your measurement. Incase of 110% over, " OVER LOAD " is indicated on display.   (This is in case of over load setting " 0 ")
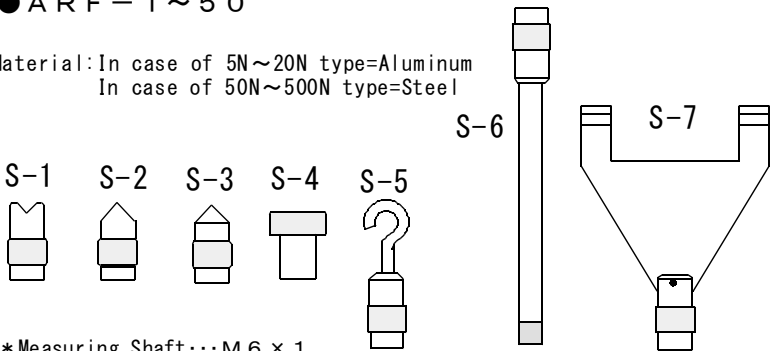
   ※In case of over load setting 1 ～ 100 %, " OVER LOAD " will be indicated on display when the load is reached over your setting value. (Regarding over load setting, please see page No.9.)

■Standard Attachments

●ＡＲＦ－１～５０

・Material:In case of 5N～20N type=Aluminum
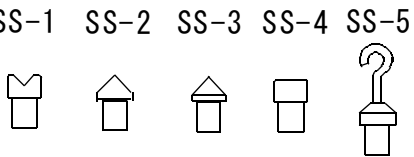   In case of 50N～500N type=Steel

S-1　S-2　S-3　S-4　S-5　　　S-6　　　S-7

＊Measuring Shaft･･･Ｍ６×１

●Model and Description
Ｓ－１･･･V-type(A)、Ｓ－２･･･V-type(B)、Ｓ－３･･･Cone-type、Ｓ－４･･･Flat-type
Ｓ－５･･･Hook-type、Ｓ－６･･･Extension Rod、Ｓ－７･･･Fork Hook-type

●ＡＲＦ－０２、０５

・Material: Aluminum

SS-1　SS-2　SS-3　SS-4　SS-5

＊Measuring Shaft･･･Ｍ３×０.５

●Model and Description
ＳＳ－１･･･V-type(A)、ＳＳ－２･･･V-type(B)、ＳＳ－３･･･Cone-type
ＳＳ－４･･･Flat-type、ＳＳ－５･･･Hook-type

■Description of Parts and Functions

External Input/Output

Power Connector

CON.

DC

LCD Disply

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MADE IN JAPAN

Protection Glass

Model and
Max.Capacity Sticker

ARF-20
MAX. Capacity 200.0 N
20.00 Kg   44.00 lb

Power Switch

Data Output Switch

P D F

Function Switch

RESET

Reset Switch

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NO. 01234

Serial Number Sticker

Measuring Shaft
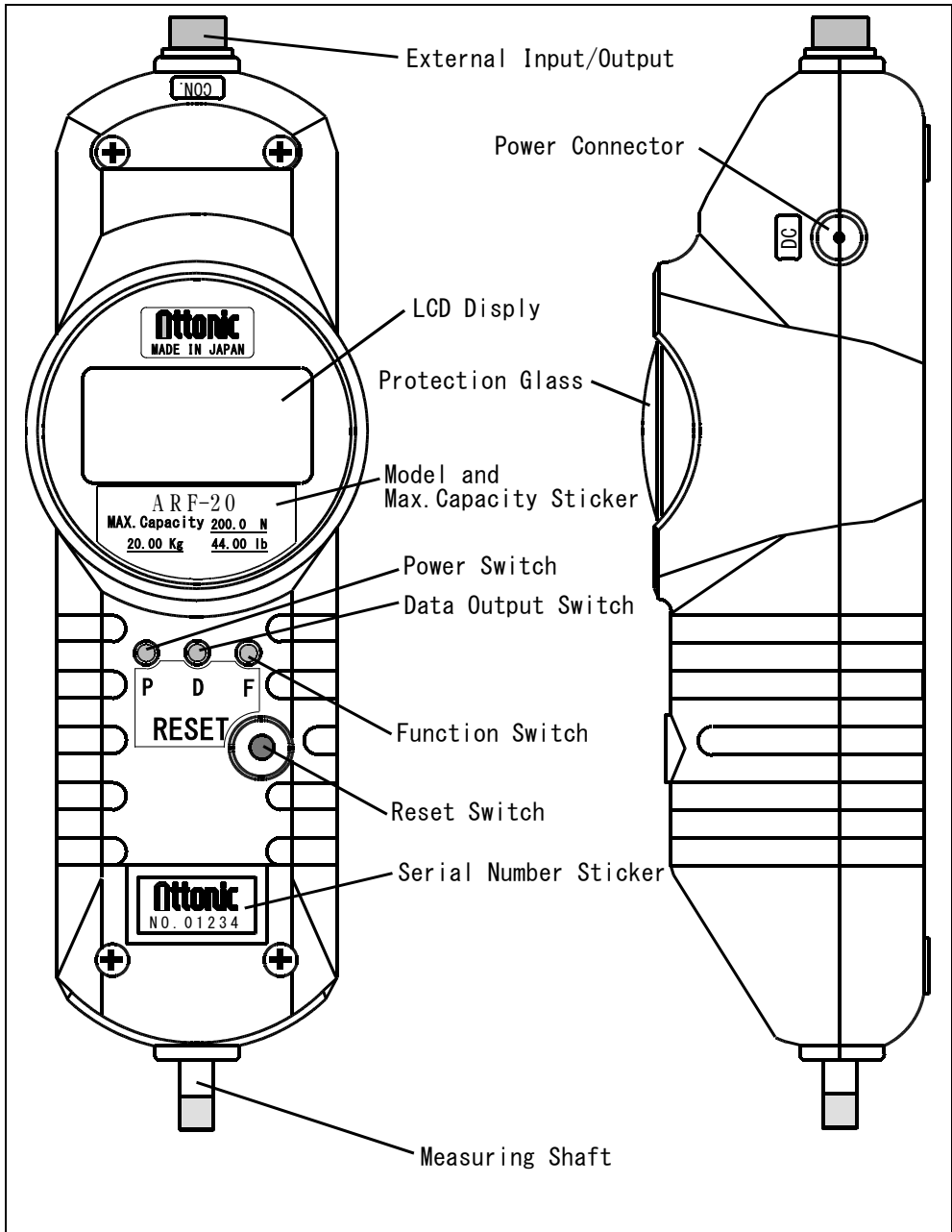
■Explanation of each parts (1)

- EXTERNAL INPUT / OUTPUT (CON.)

It is possible to do the various outside output and display reset from outside. For details, see the explanation of the output connector page No.9.

- POWER CONNECTOR (DC)

Insertion connector of AC adapter for the charging. The standard recharging time is about 4 hours after making a power off.The charging condition can be confirmed by display when making a power on. Also, it can be used inserting AC adapter. However, it becomes the cause which hastens the degradation of the charging battery. Recommend to use without using AC adapter as much as possible.

- GAIN ADJUST DIAL

ONLY MANUFACTURE SIDE (NEVER CHANGE THIS DIAL)
It is used when the calibration at the manufacture.

- LCD DISPLAY

Using graphic LCD (liquid crystal), it is possible to show a feature character, setting character, numbers and charging scale in the display.

- PROTECTION GLASS

Digital display is covered by protection glass.

- MODEL AND MAX. CAPACITY STICKER

Model number and maximum display value of 3 units and indicated.

- POWER SWITCH (P)

On/Off button of the power. The buzzer sounds in case of start the operation.

- DATA OUTPUT SWITCH (D)

Output button for the digimatic signal and RS-232C signal of the data.It outputs a digital signal firstly and it outputs a RS-232C signal.

● (Caution)

It outputs the digital signal when using a function feature. Also, in case of function feature (FU), it can be changed Peak Hold and Tracking, the reading of memory data and various setting of value.

■ Explanation of each part(2)

・FUNCTION SWITCH (F)

This button is for setting up each function. To change function mode, keep to push about 6 seconds. ("FU" is indicated in LCD Dispay), can be set up each function.

・RESET SWITCH

This button is for resetting data indication of peak-hold and tracking.

Besides when the mode is function (FU), you can reset all of the memory data (but cannot reset the data one-by-one), and can alter the figure (then the figure is underlined) by this button.

・SERIAL NUMBER STICKER

Serial number is mentioned on this sticker.

・MEASURING SHAFT

This shaft is for detecting the force.
The size of shaft screw is M6 X 1.
Attachment can be set on this top of shaft screw.

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■Explanation of a button setting function (1)

Various functional set up in button operation.

●Set up the function

①Change Peak Hold (PEAK) and Tracking (TRUCK)
②Check Memory (MO) Data and Elimination of all memory data
③Set up Comparator Function (HI)
④Set up Comparator Function (LO)
⑤Change Measuring Unit (UN)
⑥Set up Over Load (OV)
⑦Set up Power Auto Off(AP)
⑧Set up Number of Digits on display / NP setting
⑨Reverse Digital Display

Power switch is turned ON while pressed the P-button. (Becomes MEASUREMENT MODE)
(When there is no key 2-3minutes, a power supply is turned off automatically)
Keep to push F button about 6 seconds, indicate by FU (function). (Becomes SETTING MODE)
Preparations the various setting were completed.

The programming procedure after FU display
①**Change Peak Hold (PEAK) and Tracking (TRUCK)**
Change the Peak hold (PEAK) and change the tracking (TRUCK) when pressed the D button. (Initial setting : TRACK)
↓

Push F button
②**Check Memory (MO) Data and Elimination of all memory data**
" MO " in the upper right side of the display. Can be confirmed the memory date.   The memory data is advanced when press the D button. (from M01 up to M50)
Elimination of all memory data should press the RESET button.
(Each data is not eliminable)
The display indicate MO 0 when data is eliminated. (Initial setting : 0)
↓

Push F button
③**Set up Comparator Function (HI)**
Set up the upper limit of comparator function Figure rising by D-button and Digit rising by RESET-button. When not using this function, setting to the 0. (Initial setting : 0)
↓

■Explanation of a button setting function (2)

Push F button

④Set up Comparator Function (LO)
Set up the low limit of comparator function.　　Figure rising by D-button and Digit rising by RESET button. When not using this function, setting to the 0.
(Initial setting : 0)

↓

Push F button

⑤Change Measuring Unit (UN)
To push D button, display change from N→Kgf→lbf→N・・・
(Initial setting : N)

↓

Push F button

⑥Set up Overload (OV)
Count up by D button.　Figure up by RESET button.
Setting value is %.　　It cannot set under 0.
When not using this function, setting to the 0.
(Initial setting : 0)
In case of setting 0,　" OVER LOAD " will be indicated on display when the load is reached from 100% to 110% of full scale.

↓

Push F button

⑦Set up Power Auto Off(AP)
To push D button, Set up the Power auto off 1→release 0・・・
(Initial setting : 1)

↓

Push F button

⑧Set up Number of Digits on display / NP setting (NP)
Push "D" button.
If you need 3 digits on display, please set"1".
If you need 4 digits, please set " 2 ".
It is possible to change number of digits by this function.

↓

Push F button

⑨Reverse Digital Display
The Value becomes flashing & dark.
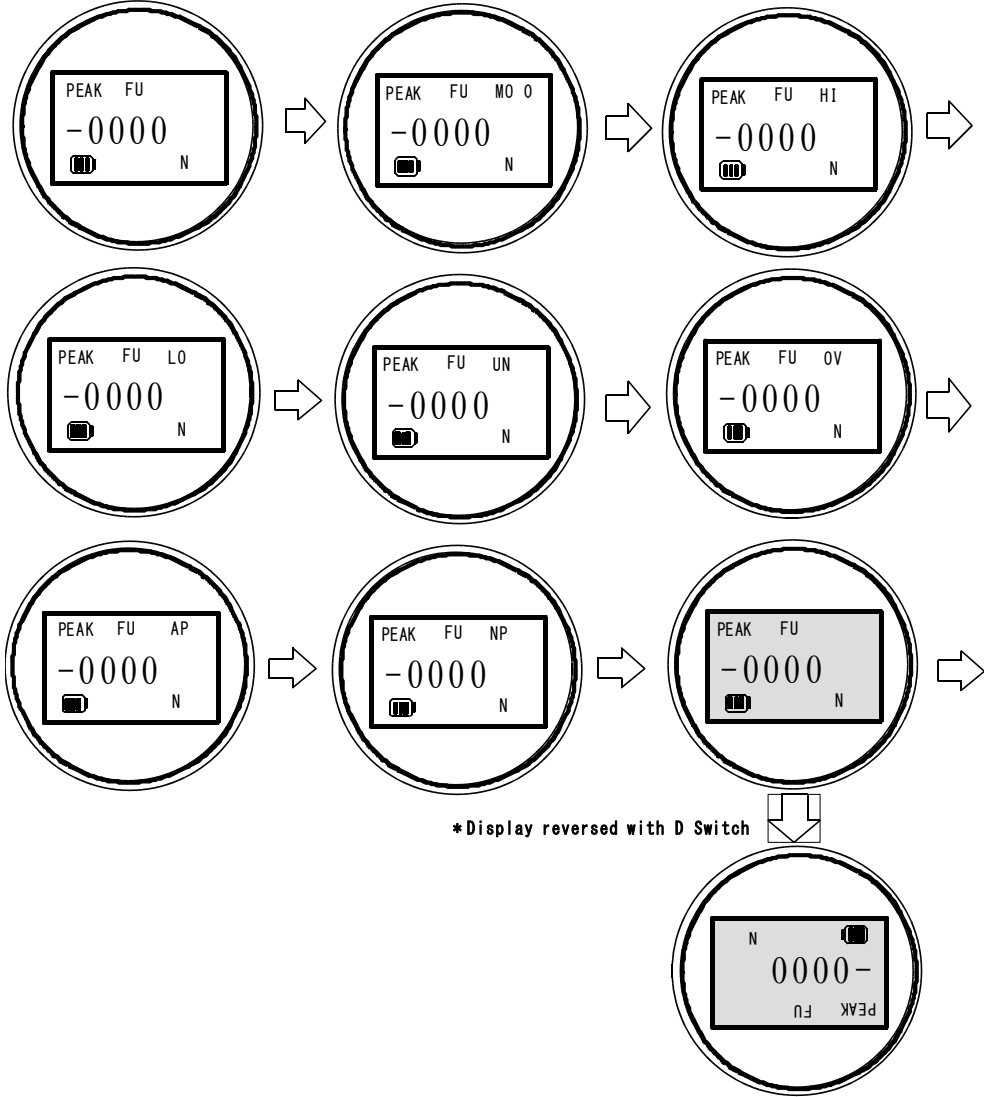To push D button, the direction of display indication is reversed in upside down position.

↓

Push F button

TO ① Change Peak Hold (PEAK) and Tracking (TRUCK)

Keep to push F button about 6 seconds, the gauge is now ready to measure.
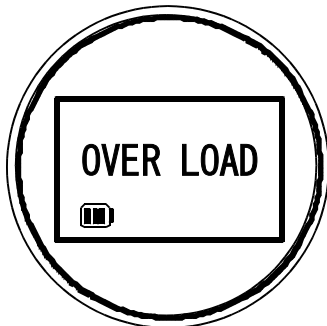
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■Digital indication for function mode

●It will become FU display if F Switch is pushed for about 6 seconds.
  (Measurement functional stop state)
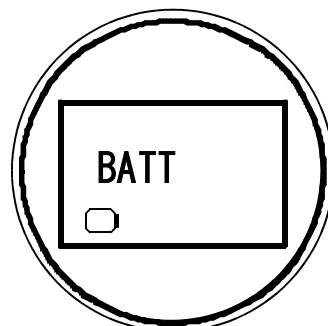 Next, if F Switch is pushed, a setup of each function can be performed.

PEAK FU −0000 N	⇒	PEAK FU MO O −0000 N	⇒	PEAK FU HI −0000 N	⇒
PEAK FU LO −0000 N	⇒	PEAK FU UN −0000 N	⇒	PEAK FU OV −0000 N	⇒
PEAK FU AP −0000 N	⇒	PEAK FU NP −0000 N	⇒	PEAK FU −0000 N	⇒

*Display reversed with D Switch

N 0000− PEAK FU

■Digital indication for warning messages

| ■Over Load Indication	■Low Battery Indication
OVER LOAD	BATT

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■External Input / Output

＊Connector of HIROSE brand HR25-9TR-16S is used.(16 pins)
  Please prepare a plug HR25-9TP-16P.
 Name of signal for each connector pin is as follows.

1．Analog output   ··· ±1V
2．Analog GND
3．Signal input for External reset··· Indication reset
4．Input COM
5．Comparator HI   ··· Open Collector Output (50V / 100mA)
6．Comparator GO   ···   〃
7．Comparator LO   ···   〃
8．Overload output ···   〃
9．Output COM
10．RS-232C Rx ··· Please refer the following RS-232C Format
11．RS-232C Tx ···   〃
12．Digimatic output (DATA)
13．Digimatic output (CK)
14．Digimatic output (RD)
15．Digimatic output (REQ)
16．GND

■Connector Form
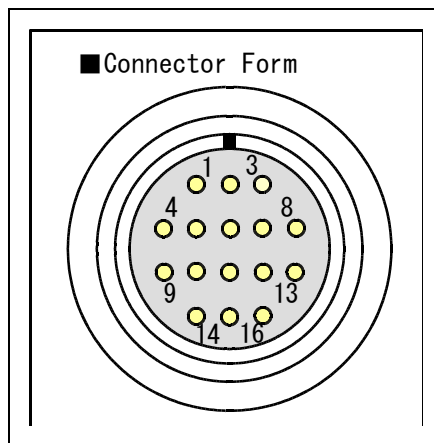
●RS-232C Format
1．Interfacing (Bit) Spec.
    ・Start Bit   : 1 bit
    ・Date Length : 8 bit
    ・Stop Bit   : 1 bit
    ・Parity   : None
    ・Baud Rate   : 9600 BPS

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