ISF-DG SERIES

ISF-DG SERIES
HANDHELD FORCE/TORQUE INDICTORS
OPERATION MANUAL

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MN-ISF-DG Series-E
V0

1.Performance indicators and characteristics

1.1 Qualification

- The sampling rate is up to 12,800 Hz;
- Nonlinearity is better than 0.01%; accuracy is better than 0.1%;
- Display score-99999~999999;
- The battery can be charged and discharged for about 1,000 times;
- Input range of analog signal-15-15 mV;
- Temperature drift is less than 20ppm;
- 3200 mAh battery, fully charged for 15 hours;

1.2 Functional Characteristics

- The sampling rate of 50Hz to 12800Hz is adjustable, and the high sampling rate is more accurate for peak capture;
- Real-time curve and the last historical curve selection display, view the force situation of the working process;
- Real-time automatic capture of equipment peak and valley value, analysis of sensor status;
- Parameter backup and recovery, modify the chaotic parameters can also be a key to restore;
- No weight calibration, only input sensor parameters to complete the calibration;
- Use the TEDS intelligent sensor, power on automatic calibration, modify the corresponding unit and decimal point;
- With low power, the instrument interface displays the low power identification, and the charging mark and the charging light are displayed when the charger is inserted;
- Use TYPE-C data line (customizable RS485) to directly connect with PC for Modbus communication to facilitate the export of force value data;
- In the interface test interface of the handheld dynamometer, you can view the serial port and wireless communication debugging data;

- Peak and valley value historical data to save 200 groups, power is not lost;
- Multiple alarm options, upper limit alarm; lower limit alarm; peak value alarm; 1.2 times automatic alarm;
- Multiple capture options, threshold-threshold; threshold-time; threshold-key;
- The same product is also available as a handheld instrument with built-in sensor;

2. Packaging and Appearance

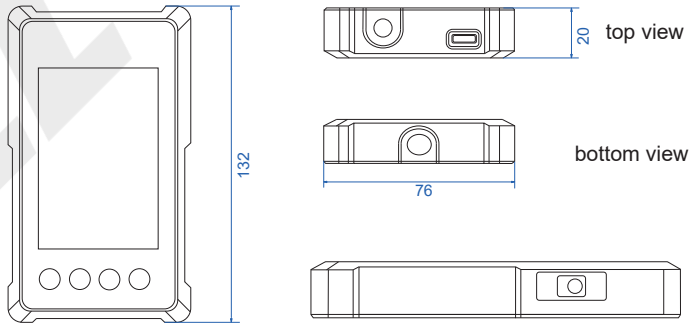

Fig.1 Product Dimension Drawing

handheld instrument

TYPE-C data line

2.3 Selection and wiring

2.3.1 Sensor selection

This handheld indictor is divided into two versions for users to choose, respectively, built-in sensor version and external sensor version.

External sensor, Need to connect to the instrument through the air plug, you can choose the company intelligent sensor. When using the intelligent sensor, the instrument can be automatically calibration, eliminating the customer calibration trouble, and it is very convenient to switch multiple sensors. Only the need to restart the instrument can complete the calibration, and the sensor can be connected to any range.

Built-in model, The sensor is built into the handheld device. You can refer to the following model table to select the appropriate range sensor.

Model	ISF-YT10	ISF-YT20	ISF-YT30	ISF-YT50	ISF-YT100	ISF-YT200	ISF-YT300	ISF-YT500
Range	10N	20N	30N	50N	100N	200N	300N	500N
Resolution	0.001N	0.001N	0.001N	0.001N	0.01N	0.01N	0.01N	0.1N

2.3.2 Sensor interface

The wiring of the sensor of this hand-held instrument is unified with the aviation plug, align the notch of the aviation plug with the inlet under the hand-held instrument, and press the end to access the aviation plug.

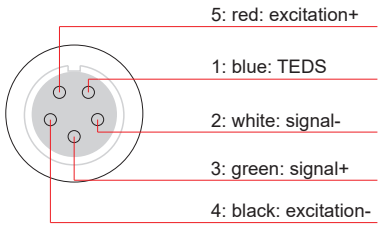

diagram of connector

2.3.3 Data transmission and charging port

The charging port is on the top of the handheld meter, the interface is TYPE-C data transmission cable, one end is connected to the meter, and the other is connected to the 5V USB port for charging operation; when communicating with a PC through this interface, please make

sure that the cable used has the function of data transmission, part of the charging cable can only carry out charging function, but can not carry out data transmission.

2.4. Battery level and switching on/off

2.4.1 Battery Level Display

The battery level display icon is located on the upper right part of the handheld, when connecting to the charger port, it will display the charging logo as shown in the figure below.

Charging status

When the battery level of the meter shows red status as shown below, please recharge it within 10 minutes.

shows the low power

2.4.2. Power on and power off

When power off, long press the side button for about 1 second to turn on the power, when the meter displays the power on picture, you can let go to finish the power on action.

When power on, long press the side button for about 2 seconds to turn off the power, then the handheld will display the power off prompt page, as shown in the following figure:

At this time, press A to turn off the power immediately or wait for 5 seconds to turn off the power automatically, and press B to cancel the power off operation.

2.5. Status Icons

During operation, the handheld meter will display some operating status icons, which are described below:

Transient regime		Force value instability: When the force value fluctuation is greater than the stability condition parameter, the icon will appear, indicating that the system is currently in an unstable state.
Zero status		When the real-time force value is less than the automatic zero range of the power, it will be zero and the icon will be displayed.
Wireless communication		When the handheld instrument wireless communication is successful, the icon will be displayed and will disappear when there is no communication within 200 ms.
String communication		When the handheld instrument serial communication is successful, the icon will be displayed and will disappear when there is no communication within 200 ms.
Alert status		When the handheld instrument reaches the set alarm condition, the icon will be displayed and the buzzer will work; when the real-time force value exceeds the set range, the icon will be displayed at 50ms interval and the buzzer works for 100 ms interval.

3.Communication description

The instrument comes with isolated RS485 serial port, which is suitable for long distance and high reliable communication. It supports three communication protocols, Modbus-RTU protocol (sub-station), ASC active upload, HEX customized upload. Default factory setting of the instrument: 19200 baud rate, 01 machine code and no parity, eight data bits, one stop bit data format. Modify the parameters related to communication, and re-power on after modification to take effect.

When using PC direct communication and RS485 communication, the internal data flow is the same except the connection method on hardware is not consistent.

3.1.Modbus-RTU Protocol

The Modbus-RTU protocol supports 03 read commands and 0x10 write commands, and the data is 32-bit Long long integer or Float floating point data.

For details about Modbus-RTU, refer to the Modbus standard text. To use this function, you need to change the serial communication protocol parameter to 1.

3.1.1. Read Command In this instrument, reading needs to use 0x03 read command, most of the parameters are larger than 16 bits, so it is limited to read at least 32 bytes.

Most of the parameters are larger than 16 bits, so it is limited to read at least 32 bytes, and the number of bytes must be even for each reading.

Example 1: 0x03 Read Measured Value

Main Station Send:				
01	03	07 D0	00 02	C4 86
Machine code	Read command	Start address	Number of reads	Check code
Instrument Return:				
01	03	04	00 00 03 E8	FA 8D
Machine code	Read command	Start address	Number of reads	Check code

3.1.2 Write Commands

Example 1: 0x10 communication clearing

The master station sends the reset command:						
01	10	0B B8	00 02	04	00 00 00 0A	0A 4A
Machine code	Order	Communication command address	Number of registers	Number of bytes to write	Write 10 for zero	Check code
The instrument returned:						
01	10	0B B8	00 02	C2 0F		
Machine code	Read command	Start address	Number of reads	Check code		

Example 2: 0x10 communication calibration

1、Send the clear command when the meter is idle

01 10 0B B8 00 02 04 00 0000 0A 0A4A

2, the weight will be placed on the sensor, stabilized after the weight force value of 10000 (0x2710) will be written to 3000 (0xBBA) address)

01 10 0B BA 0002 04 0000 27 10 11 A8

3、Send the calibration command to complete the calibration

01 10 0B B8 0002 04 0000 00 14 8A 42

Partial parameter address list:

The parameter name	Operate	Address (decimal)	Function
Zero clearing	write only	Write 10 to address 3000	Zero up the real-time value of the instrument display
Clear peak	write only	Write 11 to address 3000	Clear the instrument peak value
Read the peak	read only	2562	
Read the valley value	read only	2564	
Read real-time force values	read only	2000	

3.2.ASCII active upload protocol

The advantage of using ASCII uploading method is that the communication speed is fast, the instrument does not need to receive data, and it keeps sending real-time force value outward, when using this function, you need to change the parameter of the serial communication protocol to 2. The data example is as follows:

20	20	20	20	31	2E	31	3D
leave a blank space	leave a blank space	leave a blank space	leave a blank space	1	.	1	=

By checking the ASCII table, it can be seen that the above force value data is 1.1. and ends with 0x3D as the symbol "=", which is the separator of communication data.

3.3.HEX Active Upload

HEX upload is our customized upload protocol, when using this function, you need to modify the serial communication protocol parameter to 3. The data format such as: 00 00 C2 CA 8C

The length of a packet is 5 bytes, the first four bytes are 32-bit long

integer force value data, the high bit is in the front, and the last bit is the cumulative parity of the first four bits to the eighth bit.

4. Parameter list

4.1. Advanced parameters

Address	Parameter name	Default value	Ranges	Description
282	Sampling Speed	1	0-5	0-50Hz; 1-200Hz; 2-800Hz; 3-3200Hz; 4-6400Hz; 5-12800Hz (Restart to take effect)
284	Unit	3	0-7	0-No unit; 1-T; 2-kN; 3-kg; 4-lb; 5-N; 6-g; 7-N·M
286	Radix Point	2	0-5	0-no decimal point; 1-one decimal point; 2-two decimal point
290	Ordinary password	0	0-999	Modify the common password. Default is 0
292	Advanced password	100000	0-999999	Modify the advanced password. Default is 100000
360	Run the picture setting	8753	0-999999	Run page Settings, non-professional personnel do not modify, can adjust the main interface default display, 8 for historical data interface, 7 for historical curve interface, 5 for real-time curve interface, 3 for real-time value interface, to real-time curve interface default display, modified to 8735, modify error may not be able to start the machine, communication can change back
368	Y axis end point	1000	0-999999	Curve Y-axis endpoint, increase the value curve Y-axis display more comprehensive, reduce the value display more detailed
378	Displays the interval time	0	0-9.999	Curve drawing speed, the larger the interval, the slower the curve is drawn
380	Serial Communication Protocol	1	0-3	0-null; 1-modbus-RTU; 2-ascii proactive uploads; 3-hexadecimal proactive uploads
382	Machine code	1	0-255	Machine code: This address is used for wireless communication, 485
384	Baud rate	4	0-6	0-2400bps; 1-4800bps; 2-9600bps; 3-19200bps; 4-38400bps; 5-57600bps; 6-115200bps (Restart to take effect)
386	Data Format	0	0-1	0-N81; 1-N82 (No check bit, eight-bit data bits, and two-bit stop bits)
388	Communication packet interval	10	0-9999ms	The communication packet is returned after receiving the delay
430	Zero code value	0	-99999-9999999	AD code value corresponding to the zero point
432	Range coefficient	5000	0-9999999	Force value dependent parameter (increased if the displayed value is always 0)
474	TEDS function	0	0-1	0-off; 1-on
476	Nonlinear calibration	0	0-1	0-off; 1-on
480	480	0	-999999-999999	Zero time instrument code value, non-professionals do not modify
482	Enter the hardware full	100000	-999999-999999	When the instrument code value is at full range, non-professionals should not modify it

Address	Parameter name	Default value	Ranges	Description
488	485 High-and low-level selection	0	0-1	0: High in the front 1: Low before (change to 0)
540	Correction before value 1	5000	-99999-999999	Real-time value before correction at point 1
542	Adjustment coefficient 1	10000	5000-99999	Point 1 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
542	Correction before value 2	5000	-99999-999999	Real-time value before correction at point 2
546	Adjustment coefficient 2	10000	5000-99999	Point 2 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
548	Correction before value 3	5000	-99999-999999	Real-time value before correction at point 3
550	Adjustment coefficient 3	10000	5000-99999	Point 3 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
552	Correction before value 4	5000	-99999-999999	Real-time value before correction at point 4
554	Adjustment coefficient 4	10000	5000-99999	Point 4 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
556	Correction before value 5	5000	-99999-999999	Real-time value before correction at point 5
558	Adjustment coefficient 5	10000	5000-99999	Point 5 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
560	Correction before value 6	5000	-99999-999999	Real-time value before correction at point 6
562	Adjustment coefficient 6	10000	5000-99999	Point 6 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
564	Correction before value 7	5000	-99999-999999	Real-time value before correction at point 7
566	Adjustment coefficient 7	10000	5000-99999	Point 7 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
568	Correction before value 8	5000	-99999-999999	Real-time value before correction at point 8
570	Adjustment coefficient 8	10000	5000-99999	Point 8 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
572	Correction before value 9	5000	-99999-999999	Real-time value before correction at point 9
574	Adjustment coefficient 9	10000	5000-99999	Point 9 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
576	Correction before value 10	5000	-99999-999999	Real-time value before correction at point 10
578	Adjustment coefficient 10	10000	5000-99999	Point 10 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
580	Correction before value 11	5000	-99999-999999	Real-time value before correction at point 11
582	Adjustment coefficient 11	10000	5000-99999	Point 11 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
584	Correction before value 12	5000	-99999-999999	Real-time value before correction at point 12
586	Adjustment coefficient 12	10000	5000-99999	Point 12 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
588	Correction before value 13	5000	-99999-999999	Real-time value before correction at point 13
590	Adjustment coefficient 13	10000	5000-99999	Point 13 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
592	Correction before value 14	5000	-99999-999999	Real-time value before correction at point 14
594	Adjustment coefficient 14	10000	5000-99999	Point 14 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)
596	Correction before value 15	5000	-99999-999999	Real-time value before correction at point 15
598	Adjustment coefficient 15	10000	5000-99999	Point 15 adjustment coefficient = actual value / real-time value before correction (keep four-digit decimal input)

4.2. Basic parameters

Address	Parameter name	Default value	Ranges	Description
8	The hysteresis ratio	10	1-99	Force value is less than the hysteresis ratio multiplied by the end of capture
14	End capture condition	0	0-3	0-End of delay; 1-end of threshold; 2-End of button; 3-Unconditional mode
16	Start capturing the threshold	50	0-999999	When the force value is greater, start the historical curve record, and the peak and valley value is cleared, and the peak and valley value record starts
18	Capture time	1s	0-999.9s	End the capture
20	Capture interval time	0.5s	0-999.9s	Interval between capture (prevent miscapture)
240	Filtering	10	1-99	Curve recording, communication and other data filtering, the larger the value, the stronger the filtering ability
246	Determine the scope of stability	2	0-200d	The fluctuation in this range is judged to be stable
252	Power clearance range	50	0-999999	If the force value is within the range, it will be automatically cleared
254	Automatic zero range	0	0-999999	The end condition reaches the force value range of starting the automatic zero clearance
258	Automatic zero clearance and delay time	1.0s	0-9.999s	After the end condition is reached, the delay starts to automatically clear zero
260	The alarm way	0	0-4	Alarm under this condition 0-no alarm; 1-force value> alarm value; 2-force value <alarm value
262	Alarm value	5000	-99999-999999	3-Peak value> alarm value; 4-valley value <alarm value;
264	Peak valley alarm time	1.0	0-99.9	Value to compare when warning

5. Frequently Asked Questions

Q: The instrument display value is jumping?

A: Please confirm whether the sensor wiring is normal, in order to improve the high-speed sampling performance, the force value is not fixed to 0; usually the display value is due to the sensor; please check the range coefficient parameter in the advanced parameter, generally within 100000, if much greater than the value, reduce the parameter and recalibrated;

Q: Peak peaks not captured the way I wanted?

A: Please change the “End Capture Condition” parameter and adjust the parameter according to your desired mode;

Q: How is the historical curve displayed?

A: When A complete start-end condition process is completed, it will automatically display;

6.Warranty

● Products from the date of sale, the whole machine warranty for one year.

● During the warranty period, if the product is faulty, contact our company in time and shall not remove it by itself, otherwise the company has the right to refuse the warranty.

● Charge for repair under any of the following circumstances:

► Products with of warranty.

► Damaged due to poor transportation or storage or failure to operate as required by the instructions.

► Products independently disassembled or not repaired by the company's warranty point.

► Products with no product number or no product number on the warranty form that does not match or alter the product number sent for repair.

► Damage other than product quality causes during the warranty period.

7.Precautions

● Do not use in equipment such as atomic energy equipment and life-related medical equipment.

● Do not mix metal pieces or wire fragments into this product, as this may cause electric shock, fire, or malfunction.

● Make sure that the aerial plug is securely plugged in, as incomplete plugging in may result in electric shock or fire.

● Be sure to disconnect the power before cleaning.

● When cleaning, wipe off the product with a dry, soft cloth. Do not use moisture absorbers. Otherwise, it may lead to deformation and discoloration.

8.Product Selection

- For use with force sensors and torque sensors
- Three modes of real-time value display, peak value display and valley value display
- Force unit: N, kN, kg, lb, t
- Torque unit: N.m, kg.cm, in.lb, ft.lb
- High sampling rate captures peak value accurately
- Select to display the real-time curve and the last historical curve
- Real-time automatic capture of peak value and valley value
- Parameter backup and restoration, even if the parameters are messed up, you can restore them with a single click
- Weightless calibration, just enter the sensor parameters and you are ready for calibration
- A variety of alarm options: upper limit alarm, lower limit alarm, peak and valley alarm, over 1.2 times of the range alarm
- Supply voltage 3.5V, analog signal input range -15~15mV

SPECIFICATION

Code	ISF-DG1	ISF-DG2	ISF-DG3	ISF-DG4
No. of channels	7 channels	7 channels	single channel	single channel
Max. sampling frequency	3200Hz	12800Hz	3200Hz	3200Hz
Type	force+torque	force+torque	force	torque
Unit switch	switching units requires recalibration		units can be switched in real time	
Accuracy	±0.1% (of load capacity)			
Output	TYPE-C			
No. of memory	200 groups			
Power supply	built-in rechargeable battery, can be used for 15 hours			
Dimension	132×76×20mm			
Weight	300g			

STANDARD DELIVERY

Main unit	1pc
Power adapter	1pc