

# I-87089W

## User Manual

### Warranty

All products manufactured by ICP DAS are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

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## 1. Introduction

The vibrating wire sensor has a wire which is initially plucked by a series of electrical magnetic forces from a coil. The conductive wire after plucking is vibrating in a magnetic field. The wire will disturb the field, and then the coil can pick up the induced voltage change. The signal is amplified and detected by a VW readout device, or called VW reader. After plucking, there is no other force acting on this wire. When the transient response dies out, the reader can read a stable resonant frequency. The resonant frequency is function of the tension of this wire.

## 1.1. SCAN Frequency Table

The I-87089W has five SCAN Frequency Value for user select.

No	SCAN Frequency Range
0	400 Hz ~ 3 KHz
1	450 Hz ~ 1.2 KHz
2	800 Hz ~ 2 KHz
3	1.4 KHz ~ 3.5 KHz
4	2.4 KHz ~ 6 KHz

## 1.2. Default Settings

The default settings for the I-87089W are:

- Protocol : DCON
- Address : 00
- Baud Rate : 115200 bps
- Checksum : Disabled

### 1.3. Configuration Tables

#### Baud Rate Settings (CC)

Code	03	04	05	06	07	08	09	0A
Baud Rate	1200	2400	4800	9600	19200	38400	57600	115200

#### Type Code Settings (TT)

The Type Code of I-87089W is fixed 40.

#### Data Format Settings (FF)

7	6	5	4	3	2	1	0
Reserved	CS	Reserved			Reserved		

Key	Description
CS	Checksum settings 0: Disabled 1: Enabled

## 2. DCON Protocol

General Command Sets			
Command	Response	Description	Section
\$AAM	!AA(Data)	Reads the name of the module	2.1
#AA0BC	!AAF+(Data) T+(Data)	Read Frequency value and Temperature with SCAN Frequency Table.	2.2
#AAFNBC	!AA+(Data)	Read Frequency value with SCAN Frequency Table.	2.3
#AATNBC	!AA+(Data)	Read Thermistor Temperature with SCAN Frequency Table.	2.4
@AARN	!AA	Set Delay time value of read VW Sensor	2.5
@AAR	!AA(Data)	Read Delay time value	2.6
@AAAN	!AA	Set Average value	2.7
@AAA	!AAN	Read Average value	2.8
\$AAGNN	!AA	Set Trigger Setting Value.	2.9
\$AAG	!AA(Data)	Read Trigger Setting Value.	2.10
\$AAVSN	!AA(Data)	Set SCAN Frequency Range Value.	2.11
\$AAVS	!AA	Read SCAN Frequency Range Value	2.12

## 2.1. %AANNTTCCFF

<b>Description:</b>	
This command is used to read the name of a specified module.	
<b>Syntax:</b>	
<b>\$AAM[CHKSUM](CR)</b>	
\$	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
M	The command to read the name of the module
<b>Response:</b>	
Valid Response:	<b>!AA(Data)[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
(Data)	A string showing the name of the module
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: \$01M	
Response: !0187089	
Reads module 01 and returns a valid response with the name.	

## 2.2. #AA0BC

<b>Description:</b>	
Read Frequency value and Temperature with SCAN Frequency Table.	
<b>Syntax:</b>	
<b>\$AA0BC[CHKSUM](CR)</b>	
#	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
0	Read Frequency value and Temperature
B	Address of DN-1618UB (1~8)
C	Channel of DN-1618UB (1~8)
<b>Response:</b>	
Valid Response:	<b>!AAF+(DATA)T+(DATA)[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
F+	Frequency of VW Sensor, Positive value
T+	Temperature of VW Sensor. Positive value
(Data)	xxxx.xx
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: #01011	
Response: !01F+2463.95T+0024.00	
Reads the VW sensor value of CH1 from DN-1618UB(Address:1)	
Command: #01015	
Response: !01F+2463.85T+0023.91	
Reads the VW sensor value of CH5 from DN-1618UB(Address:1)	

## 2.3. #AAFNBC

<b>Description:</b>	
Read Frequency value with SCAN Frequency Table.	
<b>Syntax:</b>	
<b>\$AAFNBC[CHKSUM](CR)</b>	
#	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
F	Read Frequency only
B	Address of DN-1618UB (1~8)
C	Channel of DN-1618UB (1~8)
<b>Response:</b>	
Valid Response:	<b>!AA+(DATA)[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
+	Positive value
(Data)	xxxx.xx
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: #01F011	
Response: !01F+2463.70	
Reads the VW sensor value of CH1 from DN-1618UB(Address:1)	
Command: #01F025	
Response: !01+2463.10	
Reads the VW sensor value of CH5 from DN-1618UB(Address:2)	



## 2.4. #AATNBC

<b>Description:</b>	
Read Thermistor Temperature with SCAN Frequency Table.	
<b>Syntax:</b>	
<b>\$AATNBC[CHKSUM](CR)</b>	
#	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
T	Read Temperature only
B	Address of DN-1618UB (1~8)
C	Channel of DN-1618UB (1~8)
<b>Response:</b>	
Valid Response:	<b>!AA+(DATA)[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
+	Positive value
(Data)	xxxx.xx
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: #01T011	
Response: !01+0024.52	
Reads the VW sensor value of CH1 from DN-1618UB(Address:1)	
Command: #01T014	
Response: !01+0023.02	
Reads the VW sensor value of CH4 from DN-1618UB(Address:1)	

## 2.5. @AARN

<b>Description:</b>	
Set Delay time value of read VW Sensor	
<b>Syntax:</b>	
<b>@AARNN[CHKSUM](CR)</b>	
@	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
R	Delay command
NN	Delay time (Unit:mS), Default:30 mS.
<b>Response:</b>	
Valid Response:	<b>!AA[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: @01R31	
Response: !01	
Set Delay time value is 31 (31 mS)	

## 2.6. @AAR

<b>Description:</b>	
Read Delay time value	
<b>Syntax:</b>	
<b>@AAR[CHKSUM](CR)</b>	
@	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
R	Delay command
<b>Response:</b>	
Valid Response:	<b>!AA(DATA)[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
(DATA)	Delay time (Unit:mS), Default:30 mS.
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: @01R	
Response: !0130	
Delay time value is 30 (30 mS)	

## 2.7. @AAAN

<b>Description:</b>	
Set Average value	
<b>Syntax:</b>	
<b>@AAAN[CHKSUM](CR)</b>	
@	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
A	Average command
N	Average Value (Range:0 ~ F), default:1
<b>Response:</b>	
Valid Response:	<b>!AA[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
A	The address of the responding module in hexadecimal format (0 to F)
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: @00A5	
Response: !00	
Set Average value is 5	

## 2.8. @AAA

<b>Description:</b>	
Read Average value	
<b>Syntax:</b>	
<b>@AAR[CHKSUM](CR)</b>	
@	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
A	Average command
<b>Response:</b>	
Valid Response:	<b>!AA(DATA)[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
(DATA)	Average Value (Range:0 ~ F), default:1
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: @00A	
Response: !005	
Average value is 5	

## 2.9. \$AAGNN

Description:	
Syntax:	
<b>\$AAGNN[CHKSUM](CR)</b>	
\$	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
G	Trigger command
NN	Trigger Value (Range:01 ~ 15), Default:00
Response:	
Valid Response:	<b>!AA[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
Examples:	
Command: \$00G03	
Response: !00	
Set Trigger value is 3 of I-87089W (Address:0)	

## 2.10. \$AAG

<b>Description:</b>	
Read Trigger Setting Value.	
<b>Syntax:</b>	
<b>\$AAG[CHKSUM](CR)</b>	
@	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
G	Trigger command
<b>Response:</b>	
Valid Response:	<b>!AA(DATA)[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
(DATA)	Trigger Value (Range:01 ~ 15), Default:00
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: \$00G	
Response: !0003	
The Trigger value is 3 of I-87089W (Address:0)	

## 2.11. \$AAVSN

<b>Description:</b>	
Set SCAN Frequency Table Value.	
<b>Syntax:</b>	
<b>\$AAVSN[CHKSUM](CR)</b>	
\$	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
VS	SCAN Frequency Range command
N	SCAN Frequency Range Value (Range:0 ~ 4), Default:0
<b>Response:</b>	
Valid Response:	<b>!AA[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: \$01VS1	
Response: !01	
Set SCAN Frequency Range is 450 Hz ~ 1.2 KHz	
Command: \$01VS2	
Response: !01	
Set SCAN Frequency Range is 800 Hz ~ 2 KHz	



## 2.12. \$AAVS

<b>Description:</b>	
Read SCAN Frequency Table Value.	
<b>Syntax:</b>	
<b>\$AAVS[CHKSUM](CR)</b>	
@	Delimiter character
AA	The address of the module to be read in hexadecimal format (00 to FF)
VS	SCAN Frequency Range command
<b>Response:</b>	
Valid Response:	<b>!AA(DATA)[CHKSUM](CR)</b>
Invalid Response:	<b>?AA[CHKSUM](CR)</b>
!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module in hexadecimal format (00 to FF)
(DATA)	SCAN Frequency Range Value (Range:0 ~ 4), Default:0
There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.	
<b>Examples:</b>	
Command: \$01VS	
Response: !010	
SCAN Frequency Range is 400 Hz ~ 3 KHz of I-87089W (Address:1)	
Command: \$01VS	
Response: !011	
SCAN Frequency Range is 450 Hz ~ 1.2 KHz of I-87089W (Address:1)	