

User Manual

Universal Process Indicator

DQ-500 UN series



(Applicable for Temperature, Humidity, Pressure, CO2, Air velocity ,Level etc...)

Digiqual Systems

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⇒ Introduction

Thank you for buying the product , Digiquil Universal Process Indicator is basically a single Input Isolator, which accepts Thermocouples, RTDs, Ohms, Voltage, Current inputs Manufacture selectable (provide Input, Output , Operating Voltage Before order). Also available option Current, Voltage, Isolated Retransmission output , 48VAC/24VDC/100-240VAC supply Voltage , Communication RS485/232, transmitter supply 12VDC or 24 VDC etc...

MAIN FEATURES:

- Mp Based modular inputs / Outputs supporting multiple input voltage/current and two-wire transmitters. Suitable for measuring and

Output Current , Voltage etc with measurement accuracy of 0.3% full scale.

- Optional Dual display windows, convenient to set parameters . Various dimensions are selectable.

- With functions of digital calibrating, digital filtering it is free of maintenance and easy operated.

- Supports RS485 communication interface, able to communicate with computers.

- Retransmission function, cooperating with X5 high precision Isolated current output module (0.2%FS

- High quality and performance hardware design, using high performance tantalum capacitor or ceramic

capacitor. Compared to competing models, it consumes less electricity, experiences less temperature

shifting, provides higher stability and reliability and can work in a wider range of temperature. The power

and I/O terminals have passed the anti-interference test of 4KV/5KHz burst of pulses.

- Universal 100-240V power supply, with thunderbolt proof and 10 seconds protection from connecting to

380VAC by mistake.

Installation and replacement of modules

Before the instrument delivery, module installation is done on request, with corresponding parameter set correctly. Users can replace or install modules by themselves when needed. When replacing a module, you should pull the controller out of the housing at first, insert a small flat-tip screwdriver into the opening between the original module 8 and the slot on motherboard to remove the old module, and then install a new module. Changing module type needs to modify the corresponding parameters.

Electric isolation of the modules

There are a group of 24V and a group 12V power supply built in the instrument and isolated to the main circuit. The 24V power commonly supplies voltage output module, such as V24/V12/V10/V5, I2 and I4. The 12V power is commonly supplies output or communication module. Generally, the relay contact output and TRIAC no contact discrete output are self insulated from the other circuit, no matter whether other modules are installed or not. SSR output voltage does not need to be insulated from input circuit, because SSR itself has isolation function. Therefore, only the electric isolation between the communication interface and the current output should be considered. Those modules, for example, S (RS485 communication interface), R (RS232 communication interface) and X3 (linear current output), all need the 12V power supply. If more than one of the above modules are installed, in order to be electric isolated, only one of them can be module without electric isolation, the other modules should be S4 or X5, which has its own isolated power supply. For example, if an X3 module is installed in OUTP (main output) slot, for isolate purpose, COMM slot should be install S4 or X5. _

Voltage output module:

The voltage output modules like V24, V12, V10 or V5 are often used for supplying power for external transducer or feedback resistance of transmitter. These modules can be installed in any slot. To standardize the wiring, it is recommended to be installed in the first idle slot in the order of MIO, AUX

Technical Specifications

Input type :

Thermocouple: K, S, R, E, J, N

Resistance thermometer: Pt100, Cu50

Linear voltage: 0~5V, 0~1V, 0~500mV, 0~100mV, 0~60mV, 0~20mV, 100~500mV, 0~10V, 0~20V,

Linear current (should connect a external resistor or install I4 module in MIO slot): 0~20mA, 4~20mA

Linear resistor: 0~80 ohm, 0~400 ohm

Alternating current: 0~5A required Module I7

Alternating voltage: 0~500VAC required Module I7

Measurement range :

K(0~+1300°C), S(0~1700°C), R(0~1700°C), E(0~1000°C), J(0~1200°C), N(0~1300°C),

Pt100(-200~+800°C), Cu50(-50~+150°C)

Optional: apart from the above-mentioned Input type, an additional type can be provided upon request. (Graduation index is needed)

Instrument Input range : Linear Input: -9990~30000 defined by user

Measurement accuracy : 0.25%FS \pm 1 measurement unit

Temperature shift : $\leq 0.015\%$ FS / ° C (typical value is 80ppm/° C)

Sampling period : read A/D converter 8 times per second

Response time : ≤ 0.5 s (when digital filter parameter FILT=0)

Output mode (modularized)

Linear current/Voltage output : 0 to 20mA, 4 to 20mA , 0 to 10 VDC , 0 to 5 VDC, 1 to 5 VDC can scaling by manufacturer.

(Output voltage : X5 \geq 7V maximum load resistor 750ohm, output precision 0.2%FS)

Module X3 for Non Isolated Output

Electromagnetic compatibility (EMC): ± 4 KV/5KHz according to IEC61000-4-4; 4KV according to IEC61000-4-5.

Isolation withstanding voltage : Between power, relay contact or signal terminals ≥ 2300 VDC; between isolated electroweak terminals ≥ 600 V

Power supply : 100~240VAC, -15%, +10% / 50-60Hz; 120~240VDC; or 24VDC/AC, -15%, +10%.

Power consumption : ≤ 5 W

Operating Ambient : Temperature 0~60°C; humidity $\leq 90\%$ RH

Communication function

S or S4 module can be installed at COMM slot to communicate with a computer. The instrument can be controlled by computer. AI instruments can be connected to the computer through RS232 or USB communication port. Every communication port of a computer can connect up to 60 AI instruments, or 80 AI instruments if a repeater is installed. A computer with 2 communication ports can connect up to 160 instruments. Please note that every instrument connecting to the same communication line should be set to a unique communication address. If the number of instrument are enough, 2 or more computers can be used and a local network can be set up.

AIDCS application software, a distributed control system software developed by digiqua, can control and manage 1~160 AI instruments, record the data, generate and print reports. If users want to develop their own distributed control system by themselves, the communication protocol of

TI-500 instruments can be free offered. There are many famous distributed control system software support TI instruments

PARAMETER AND SETTING

● Field parameter table (Press  and hold for 2 seconds to access)

Code	Name	Description	Setting Range
HIAL	High limit alarm	Alarm on when PV (Process Value) >HIAL; Alarm off when PV<HIAL-AHYS	-9990~ 30000
LoAL	Low limit alarm	Alarm on when PV<LoAL; alarm off when PV>LoAL+AHYS	
HdAL	Second high limit alarm	Alarm on when PV>HdAL; alarm off when PV<HdAL-AHYS	
LdAL	Second low limit alarm	Alarm on when PV<LdAL; alarm off when PV>LdAL+AHYS	
Loc	Parameter lock	0~3: allowed to modify field parameters; 4~255: can only modify "Loc"; setting Loc=808 and then pressing can access system parameter table.	0~9999

● System parameter table (set Loc=808 and then press  to access)

AHYS	Alarm hysteresis	Avoid frequent alarm on-off action because of the fluctuation of PV. For temperature alarm, it is recommended to be 0.5~2℃.	0~200																														
AOP	Alarm output assignment	<table border="1"> <thead> <tr> <th>Alarm Output to</th> <th>LdAL (x 1000)</th> <th>HdAL (x100)</th> <th>LoAL (x10)</th> <th>HIAL (x1)</th> </tr> </thead> <tbody> <tr> <td>None</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>AL1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>AL2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>AU1</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> <tr> <td>AU2</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> </tbody> </table> <p>Example: AOP = <u> 3 </u> <u> 3 </u> <u> 0 </u> <u> 1 </u> LdAL HdAL LoAL HIAL</p> <p>It shows that HdAL and LdAL are sent to AU1, LoAL has no output, HIAL is sent to AL1.</p> <p>Note : Installing L5 dual relay output module in ALM or AUX can implement AL2 or AU2 alarm.</p>	Alarm Output to	LdAL (x 1000)	HdAL (x100)	LoAL (x10)	HIAL (x1)	None	0	0	0	0	AL1	1	1	1	1	AL2	2	2	2	2	AU1	3	3	3	3	AU2	4	4	4	4	0~4444
Alarm Output to	LdAL (x 1000)	HdAL (x100)	LoAL (x10)	HIAL (x1)																													
None	0	0	0	0																													
AL1	1	1	1	1																													
AL2	2	2	2	2																													
AU1	3	3	3	3																													
AU2	4	4	4	4																													
INP	Input specification	<table border="1"> <thead> <tr> <th>INP</th> <th>Input type</th> <th>INP</th> <th>Input type</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>K</td> <td>20</td> <td>CU 50</td> </tr> <tr> <td>1</td> <td>S</td> <td>21</td> <td>PT 100</td> </tr> <tr> <td>2</td> <td>R</td> <td>26</td> <td>0~80 omhs</td> </tr> <tr> <td>3</td> <td>SPARE</td> <td>27</td> <td>0~400 omhs</td> </tr> <tr> <td>4</td> <td>E</td> <td>28</td> <td>0~20mV</td> </tr> <tr> <td>5</td> <td>J</td> <td>29</td> <td>0~100mV</td> </tr> </tbody> </table>	INP	Input type	INP	Input type	0	K	20	CU 50	1	S	21	PT 100	2	R	26	0~80 omhs	3	SPARE	27	0~400 omhs	4	E	28	0~20mV	5	J	29	0~100mV	0~37		
INP	Input type	INP	Input type																														
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		6	SPARE	30	0~60mV	
		7	N	31	0~500mV	
		8~13	SPARE	32	100~500mV	
		14	SPARE	33	1~5V	
		15	4~20mA, (14 module need)	34	0~5V	
		16	0~20mA(14 module need)	35	0~10V	
		16	0~5A (17 module need)	36	2~10V	
		16	0~500VAC(18 module need)	37	0~20V	
dPt	Resolution	Four formats (0, 0.0, 0.00, 0.000) are selectable For thermocouples or RTD inputs, only 0 and 0.0 are selectable, and the internal resolution is 0.1. For linear input, if the value of PV or any parameter is probably greater than 9999, format 0.000 is recommended.				0 / 0.0, / 0.00, / 0.000
SCL	Signal scale low limit	Define scale low limit of input signal. It is also the scale of the low limit of retransmission output. For example, to transform 1~5V input signal into process value of 0~200.0, we shall set dPt=0.0, SCL=0, SCH=200.0				-9999~
SCH	Signal scale high limit	Define scale high limit of input signal. It is also the scale of the high limit of retransmission output. For example, to transform 0~5V input signal into process value of 1000~2000, we shall set dPt=0, SCL=1000, SCH=2000.				+30000
Scb	Input shift adjustment	Scb is used to compensate the error produced by sensor or input signal. $PV_after_compensation = PV_before_compensation + Scb$. For example, for the same input signal, if the measured temperature PV is 500.0°C when Scb=10.0, then PV should be 510.0°C.				-1999~ +4000
FILt	Input filter	The value of FILt will determine the ability of filtering noise. When a large value is set, the measurement input is stabilized but the response speed is slow. Generally, it can be set to 1 to 3. If great interference exists, then you can increase parameter "FILt" gradually to make momentary fluctuation of measured value less than 2 to 5. When the instrument is being metrological verified, "FILt" s can be set to 0 or 1 to shorten the response time.				0~40
OPt	Output type	0-20: 0~20mA linear current retransmission output; 4-20: 4~20mA linear current retransmission output.				
Addr	Communication address	In the same communication line, different instrument should be set to different address.				0~80
bAud	Baud rate	The range of baud rate is 1200 ~ 19200 bit/s. Can be set to 4800, 9600 or 19200.				0~ 19200

TERMINAL LAYOUT AND WIRING

The compensation wires for different kinds of thermocouple are different, and should be directly connect to the terminals. Connecting the common wire between the compensation wire and the terminals will cause measurement error.

Symbol Description for Error code (Only With Display Instrument)

	Description
orAL	Input specification setting is incorrect Or Input wiring is disconnected__
EErr	IC Software error
8888	IC Software error

INSTRUMENT INSTALLATION AND WIRING

DQ-500

Pin No Connection

Operating Voltage : 100-240 VAC/VDC

(Or) 12-24 VDC optional

1 **Supply (L) +**

2 **Supply (N) -**

Isolated Output : 4-20mA/0 -20mA

(Or)0-10VDC/0-5VDC/1-5VDC optional

11 **output (-)**

12 **output (+)**

Signal Input : 4-20mA (or)0-10VDC/T/Cs

RTDs/Ohms/0-5AAC/0-500VAC/VDC optional

17 **Input (+)**

18 **Input (-)**

Transmitter Supply : 5/ 12 /24 VDC optional

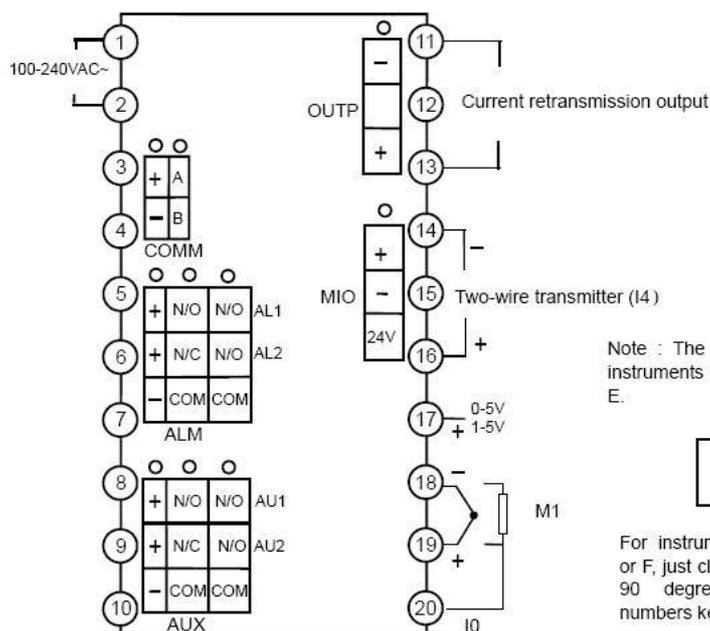
14 **Trx Output (-)**

16 **Trx Output(+)**

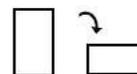
Communication Output : RS485/RS232 Optional

3 **Com Output (+)**

4 **Com Output(-)**



Note : The graph suits for upright instruments with dimension A, C or E.



For instruments with dimension B or F, just clockwise rotate the graph 90 degree and the terminal numbers keep the same.