远程通讯 Modbus 地址表功能说明

描述：

当发电机组做远程监控或上位机监控或第三方监控时，此时需要发电机组的控制模块带 RS232 或 RS485 通讯端口，通常会选 RS485 通讯端口做监控，因 RS485 通讯端口在通讯的距离上有优势，最远距离是 1200 米；目前深海带通讯功能的模块有：DSE52XX, 55XX, 73XX, 75XX 和 8000 系列模块。若使用上位机监控时，设置如下：数据位：8 bit；停止位：1 bit；无奇偶校验位；

一、 DSE52XX, 55XX, 73XX, 75XX 和 8000 系列模块可通过 Modbus 通讯协议文档计算寄存器的地址；

目前 WORD 版通讯协议寄存器的算法是 ：寄存器地址=Page 页码数*256+偏移地址。

（register_address=page_number*256+register_offset）

①.仪表显示地址的算法，如下所示：

11.6 Page 4 - Basic Instrumentation-仪表显示

Notes:

1. These are read only registers.
2. The meaning of the mains, generator and bus phase rotation codes is given in the table below.

Register offset	Name	Minimum value	Maximum value	Scaling factor	Units	Bits/ sign
0	Oil pressure	0	10000	1	KPa	16
1	Coolant temperature	-50	200	1	Degrees C	16 S
2	Oil temperature	-50	200	1	Degrees C	16 S
3	Fuel level	0	130	1	%	16
4	Charge alternator voltage	0	40	0.1	V	16
5	Battery voltage	0	40	0.1	V	16
6	Engine speed	0	6000	1	RPM	16
7	Generator frequency	0	70	0.1	Hz	16
8-9	Generator L1-N voltage	0	18,000	0.1	V	32
10-11	Generator L2-N voltage	0	18,000	0.1	V	32
12-13	Generator L3-N voltage	0	18,000	0.1	V	32
14-15	Generator L1-L2 voltage	0	30,000	0.1	V	32
16-17	Generator L2-L3 voltage	0	30,000	0.1	V	32
18-19	Generator L3-L1 voltage	0	30,000	0.1	V	32
20-21	Generator L1 current	0	99,999.9	0.1	A	32
22-23	Generator L2 current	0	99,999.9	0.1	A	32
24-25	Generator L3 current	0	99,999.9	0.1	A	32
26-27	Generator earth current	0	99,999.9	0.1	A	32
28-29	Generator L1 watts	-99,999,999	99,999,999	1	W	32 S
30-31	Generator L2 watts	-99,999,999	99,999,999	1	W	32 S
32-33	Generator L3 watts	-99,999,999	99,999,999	1	W	32 S
34	Generator current lag/lead	-180	+180	1	degrees	16 S
35	Mains frequency	0	70	0.1	Hz	16
36-37	Mains L1-N voltage	0	18,000	0.1	V	32
38-39	Mains L2-N voltage	0	18,000	0.1	V	32
40-41	Mains L3-N voltage	0	18,000	0.1	V	32

油压显示寄存器地址(Oil pressure)= Page_4 * 256+0(偏移地址)=1024

水温显示寄存器地址(Coolant temperature)= Page_4 * 256+1(偏移地址)=1025

油温显示寄存器地址(Oil temperature)= Page_4 * 256+2(偏移地址)=1026

油位显示寄存器地址(Fuel level)= Page_4 * 256+3(偏移地址)=1027

注：灵活传感器的地址读取（如 74XX 的灵活传感器）=Page_171*256+137.

选择 internal flexible sender 3，偏移地址为 136 的代表存储代码，137 为存储值：

136	Internal flexible sender 3 analogue input sender category	0	1	16
137	Internal flexible sender 3 analogue input reading	0	1	16

当软件选择为水温传感器时，对应 136 读出的值为 2，参见下图：

Sender category codes and value ranges

Type code	Type	Minimum value	Maximum value	Scaling factor	Units
0	Unused	0	0		
1	Pressure	0	10000	1	KPa
2	Temperature	-200	10000	1	Degrees C
3	Level	0	200	1	%
4-65535	Reserved				

②. **报警地址的算法(DSE5XXX 模块的报警在 Page 8 中；DSE7XXX 模块的报警在 Page 154 中)；以下举例是 DSE5XXX 模块的报警：**

11.10 Page 8 - Alarm Conditions 报警条件

Registers

Register offset	Name	Minimum value	Maximum value	Bits/ Sign
0	Number of named alarms	61	128	16
1	Emergency stop	0	15	13/16-16/16
	Low oil pressure	0	15	9/16-12/16
	High coolant temperature	0	15	5/16-8/16
	High oil temperature	0	15	1/16-4/16
2	Under speed	0	15	13/16-16/16
	Over speed	0	15	9/16-12/16
	Fail to start	0	15	5/16-8/16
	Fail to come to rest	0	15	1/16-4/16
3	Loss of speed sensing	0	15	13/16-16/16
	Generator low voltage	0	15	9/16-12/16
	Generator high voltage	0	15	5/16-8/16
	Generator low frequency	0	15	1/16-4/16

图 2

Alarm condition codes

Condition	Meaning	Displayed string
0	Disabled digital input	None
1	Not active alarm	None
2	Warning alarm	Active string
3	Shutdown alarm	Active string
4	Electrical trip alarm	Active string
5-7	Reserved	
8	Inactive indication (no string)	None
9	Inactive indication (displayed string)	Inactive string
10	Active indication	Active string
11-14	Reserved	
15	Unimplemented alarm	None

图 2

由图 1 所知：

a、紧急停止寄存器地址(Emergency stop)= Page_8 *256+1(偏移地址)=2049

b、低油压寄存器地址(Low oil pressure) = Page_8 *256+1(偏移地址)=2049

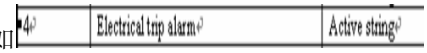
c、高水温寄存器地址(High coolant temperature) = Page_8 *256+1(偏移地址)=2049

d、高油温寄存器地址(High oil temperature) = Page_8 *256+1(偏移地址)=2049

方法一, 由图 2 所知：

a、当发生普通报警时，寄存器中存的内容是 **0010**, 如

b、当发生停机报警时，寄存器中存的内容是 **0011**，如

c、当发生电气跳闸报警时，寄存器中存的内容是 **0100**，如 

由以上可知：

虽然以上报警的寄存器地址相同，但是存在寄存器地址中内容不同，从而区分报警。

a、当发生紧急停止报警(停机类报警)时，紧急停止的寄存器地址是 2049，这个地址中的内容是 0011 0000 0000 0000（紧急停止占的是 13-16 位）

b、当发生低油压报警(停机类报警)时，低油压的寄存器地址是 2049，这个地址中的内容是 0000 0011 0000 0000（低油压占的是 9-12 位）

c、当发生高水温报警(停机类报警)时，高水温的寄存器地址是 2049，这个地址中的内容是 0000 0000 0011 0000（高水温占的是 5-8 位）

d、当发生高油温报警(停机类报警)时，高油温的寄存器地址是 2049，这个地址中的内容是 0000 0000 0000 0011（高油温占的是 1-4 位）

例如：

e、当发生高水温报警(报警)时，高油温寄存器地址是 2049，这个地址中的内容是 0000 0000 0010 0000（高水温占的是 5-8 位）

f、当发生高水温电气跳闸时，高油温寄存器地址是 2049，这个地址中的内容是 0000 0000 0100 0000（高水温占的是 5-8 位）

逐步按此方法算出各种报警寄存器地址和寄存器中内容。需特别注意的是：用触摸屏做报警时，不同报警寄存器地址不同，存储的内容也是不同的，需要去逐个测试报警地址，读取里面不报警时的内容再根据图 2 算出相应地址下的报警内容。

方法 2，用位触发指令去读取报警的位，如紧急停止在第 13 位触发，则读取它触发的第几位即可。

如用触摸屏读取，用 2049.13 读取。

Register offset	Name	Minimum value	Maximum value	Bits/ Sign
0	Number of named alarms	97	128	16
1	Emergency stop	0	15	13/16-16/16
	Low oil pressure	0	15	9/16-12/16
	High coolant temperature	0	15	5/16-8/16
	High oil temperature	0	15	1/16-4/16

③ 控制按钮地址的算法，其寄存器的地址是相同的，如图3所示：

a、停机/复位按钮地址寄存器地址(Select Stop mode)= Page_16 *256+8(偏移地址)=4104

b、手动按钮地址寄存器地址(Select Manual mode)= Page_16 *256+8(偏移地址)=4104

c、自动按钮地址寄存器地址(Select Auto mode)= Page_16 *256+8(偏移地址)=4104

d、测试按钮地址寄存器地址(Select Test on load mode)= Page_16 *256+8(偏移地址)=4104

e、启动按钮地址寄存器地址(Start engine if in manual or test modes)= Page_16 *256+8(偏移地址)=4104

f、静音按钮地址寄存器地址（Mute alarm）= Page_16 *256+8(偏移地址)=4104

g、发电合闸地址寄存器地址（Transfer to generator）= Page_16 *256+8(偏移地址)=4104

h、市电合闸地址寄存器地址（Transfer to mains）= Page_16 *256+8(偏移地址)=4104

Page 16 - Control Registers

System control keys

Function code	System control function	System control key
0	Select Stop mode	35700
1	Select Auto mode	35701
2	Select Manual mode	35702
3	Select Test on load mode	35703
4	Select Auto with manual restore mode	35704
5	Start engine if in manual or test modes	35705
6	Mute alarm	35706
7	Reset alarms	35707
8	Transfer to generator	35708
9	Transfer to mains	35709

图 3

11.15 Page 16 - Control Registers

Notes:

1. These are a mixture of read only and write only registers.
2. Registers 0 to 7 contain flags that indicate the available system control functions. If a bit is set the corresponding function code is available.
3. One of the system control keys from the table below must be written into register 8 and its ones-compliment written into register 9 with a single function 16 (write multiple registers) to perform the specified system control function.
4. Writing any other value or using a function that is not available will return extended exception code 7 (Illegal value written to register) and have no affect.
5. Function codes 0 to 31 perform exactly the same function as pressing the equivalent button on the control unit.
6. Function 34 'reset alarms' is not the same as function 7. The former resets any alarm condition codes that can be reset. The latter simulates a button which may or may not exist on the control unit, if it does not exist it will have no affect. If all alarm condition codes are able to be reset the shutdown, electrical trip and warning alarm active flags (as appropriate) in page 3 will consequently reset.

图 4

以触摸屏做监控举例说明：

由图 3 可知：

停机/复位按钮（Select Stop mode）地址寄存器地址是 4104，此寄存器中低 16 位内容是 35700(十进制数)； 8B74(十六进制数)

由图 4 可知：

停机/复位按钮地址寄存器地址是 4104，此寄存器中高 16 位内容是低 16 位的补码，即高 16 位的内容是 748B(十六进制数)，此寄存器中存的内容是 748B 8B74(十六进制数)，转换成十进制为 1955302260，触摸屏中输入的地址为十进制的寄存器内容:1955302260。

可通过此方法计算出其他按钮寄存器地址中的内容，内容可参见下列表：

按钮	System control key	低 16 位内容（十六进制）	高 16 位内容（十六进制）	寄存器内容（十六进制）	寄存器内容（十进制）
停止/复位	35700	8B74	748B	748B8B74	1955302260
手动	35702	8B76	748A	748A8B76	1955171190
模拟测试	35703	8B77	7488	74888B77	1955105655
自动	35701	8B75	748A	748A8B75	1955236725
静音	35706	8B7A	7485	74858B7A	1954909050
启动	35705	8B79	7486	74868B79	1954974585
发电机合闸/母排合闸	35708	8B7C	7483	74838B7C	1954777980
市电合闸/母排分闸	35709	8B7D	7482	74828B7D	1954712445

④. 控制按钮 LED 指示灯地址的算法：

A. 7XXX（除 75XX0 和 8XXX 地址在 page 190 页，如下图所示：

11.47 Page 190 – Unnamed output status

7xxx family register allocation 0-31

Register offset	Name	Minimum value	Maximum value	Bits/sign	Read/write
0	Digital output A status (Fuel)	0	1	16	Read only
1	Digital output B status (Crank)	0	1	16	Read only
2	Digital output E status	0	1	16	Read only
3	Digital output F status	0	1	16	Read only
4	Digital output G status	0	1	16	Read only
5	Digital output H status	0	1	16	Read only
6	Digital output D status (Gen)	0	1	16	Read only
7	Digital output C status (Mains)	0	1	16	Read only
8	STOP LED status (STOP)	0	1	16	Read only
9	MANUAL LED status (MANUAL)	0	1	16	Read only
10	TEST LED status (TEST)	0	1	16	Read only
11	AUTO LED status (AUTO)	0	1	16	Read only
12	MAINS LED status (MAINS)	0	1	16	Read only
13	MAINS BREAKER LED status (MAINS BREAKER)	0	1	16	Read only
14	GEN BREAKER LED status (GEN BREAKER)	0	1	16	Read only
15	GEN LED status (GEN)	0	1	16	Read only

可根据偏移地址算出指示灯的地址，如下所示：

a、停止/复位按钮 LED 指示灯地址（stop LED status）= Page_190 *256+8(偏移地址)=48648

b、手动按钮 LED 指示灯地址（Manual LED status）= Page_190 *256+9(偏移地址)=48649

c、模拟测试 LED 按钮指示灯地址（Test LED status）= Page_190 *256+10(偏移地址)=48650

d、自动按钮 LED 指示灯地址（Auto LED status）= Page_190 *256+11(偏移地址)=48651

e、市电存在 LED 指示灯地址（Mains LED status）= Page_190 *256+12(偏移地址)=48652

f、市电合闸/母排合闸钮 LED 指示灯地址（Mains BREAKER LED status）= Page_190 *256+13(偏移地址)=48653

g、发电合闸钮 LED 指示灯地址（Gen BREAKER LED status）= Page_190 *256+14(偏移地址)=48654

h、发电存在 LED 指示灯地址（Gen LED status）= Page_190 *256+15(偏移地址)=48655

i、模块面板 4 个 LED 指示灯中第一个 LED 指示灯地址= Page_190 *256+16(偏移地址)=4866

j、模块面板 4 个 LED 指示灯中第二个 LED 指示灯地址= Page_190 *256+17(偏移地址)=4867

k、模块面板 4 个 LED 指示灯中第三个 LED 指示灯地址= Page_190 *256+18(偏移地址)=4868

l、模块面板 4 个 LED 指示灯中第四个 LED 指示灯地址= Page_190 *256+19(偏移地址)=4869

B. 75XX 和 5XXX 的地址在 Page14 页，如下图所示：

10.15 Page 14 - Diagnostic - LEDs

Notes:

1. Generally these are read only registers to avoid conflict between the slave devices chosen LED state and commands from a master. However, in some cases a slave device may accept write commands to these registers, e.g. a hub may have LEDs which are not controlled by the hub itself but from a master device. A slave device may only accept write commands to these registers if this does not cause a conflict with internally generated controls of the outputs.
2. These registers represent the state of the actual LEDs on the control unit after any internal processing and are primarily intended for diagnostic purposes only (but see note 1).
3. Register 0 indicates the number of LEDs that are supported, any software that displays these must cope with any number up to 128.
4. Unimplemented LEDs (including totally unimplemented registers) return 15, not an exception.

Registers

Register offset	Name	Minimum value	Maximum value	Scaling factor	Units	Bits/ Sign
0	Number of LEDs	0	128			16
1	LED 1 colour (see table below)	0	15			13/16-16/16
	LED 2 colour	0	15			9/16-12/16
	LED 3 colour	0	15			5/16-8/16
	LED 4 colour	0	15			1/16-4/16
2	LEDs 5-8 colour	0	15			16
3	LEDs 9-12 colour	0	15			16
4	LEDs 13-16 colour	0	15			16
5	LEDs 17-20 colour	0	15			16
6	LEDs 21-24 colour	0	15			16

1) 停止 LED 灯的地址为 3588, bits 1-4 (LED 16).有效位即高位在第 1 位；
2) 手动 LED 灯的地址为 3588, bits 5-8 (LED 15). 有效位在第 5 位；
3) 自动 LED 灯的地址为 3588, bits 9-12 (LED 14). 有效位在第 9 位；
4) 市电存在 LED 灯的地址为 3587，bit1-4(LED12).有效位在第 1 位；
5）市电合闸 LED 灯的地址为 3587, bits 5-8 (LED 11). 有效位在第 5 位；
6) 发电/母排存在 LED 灯的地址为 3587, bits 13-16 (LED 9). 有效位在第 13 位；
7)发电合闸 LED 灯的地址为 3587, bits 5-8 (LED 11). 有效位在第 5 位；
8）母排合闸 LED 灯的地址为 3587, bits 9-12 (LED 10). 有效位在第 9 位；

⑤ 自定义输入

A.（7XXX除75XX以外） 地址算法，如下所示：

11.40 Page 170 – Unnamed input status

7xxx family register allocation

Register offset	Name	Minimum value	Maximum value	Bits/ sign	Read/write
0	Digital input A raw status	0	1	16	Read only
1	Digital input A processed status	0	1	16	Read only
2	Digital input B raw status	0	1	16	Read only
3	Digital input B processed status	0	1	16	Read only
4	Digital input C raw status	0	1	16	Read only
5	Digital input C processed status	0	1	16	Read only
6	Digital input D raw status	0	1	16	Read only
7	Digital input D processed status	0	1	16	Read only
8	Digital input E raw status	0	1	16	Read only
9	Digital input E processed status	0	1	16	Read only
10	Digital input F raw status	0	1	16	Read only

当自定义输入 A 定义为 close to active 时，它的地址为 Page_170 *256+0(偏移地址)=43520

当自定义输入 A 定义为 open to active 时，它的地址为 Page_170 *256+1(偏移地址)=43521

当自定义输入 B 定义为 close to active 时，它的地址为 Page_170 *256+2(偏移地址)=43522

当自定义输入 B 定义为 open to active 时，它的地址为 Page_170 *256+3(偏移地址)=43523

以此类推，可算出其他自定义输入的地址。

B. 75XX 的自定义输入地址的算法：自定义输入地址都是相同的，为 12*256+17=3089，通过地址里的高低位来触发对应输入是否有效；

10.13 Page 12 - Diagnostic - Digital Inputs

17	Unnamed digital input 1	Open	Closed			16/16
	Unnamed digital input 2	Open	Closed			15/16
	Unnamed digital input 3	Open	Closed			14/16
	Unnamed digital input 4	Open	Closed			13/16
	Unnamed digital input 5	Open	Closed			12/16
	Unnamed digital input 6	Open	Closed			11/16
	Unnamed digital input 7	Open	Closed			10/16
	Unnamed digital input 8	Open	Closed			9/16
	Unnamed digital input 9	Open	Closed			8/16
	Unnamed digital input 10	Open	Closed			7/16
	Unnamed digital input 11	Open	Closed			6/16
	Unnamed digital input 12	Open	Closed			5/16
	Unnamed digital input 13	Open	Closed			4/16
	Unnamed digital input 14	Open	Closed			3/16
	Unnamed digital input 15	Open	Closed			2/16
	Unnamed digital input 16	Open	Closed			1/16

⑥自定义输出地址

A.（7XXX除75XX以外）算法，如下所示：

当自定义输出 A 地址为 Page_190 *256+0 (偏移地址)=48640

当自定义输出 B 地址为 Page_190 *256+1 (偏移地址)=48641

当自定义输出 C 地址为 Page_190 *256+7 (偏移地址)=48646

当自定义输出 D 地址为 Page_190 *256+6 (偏移地址)=48645

当自定义输出 E 地址为 Page_190 *256+2 (偏移地址)=48632

当自定义输出 F地址为 Page_190 *256+3 (偏移地址)=48642

当自定义输出 G 地址为 Page_190 *256+4 (偏移地址)=48643

当自定义输出 H 地址为 Page_190 *256+5 (偏移地址)=48644

如下图所示：

7xxx family register allocation 0-31

Register offset	Name	Minimum value	Maximum value	Bits/ sign	Read/write
0	Digital output A status (Fuel)	0	1	16	Read only
1	Digital output B status (Crank)	0	1	16	Read only
2	Digital output E status	0	1	16	Read only
3	Digital output F status	0	1	16	Read only
4	Digital output G status	0	1	16	Read only
5	Digital output H status	0	1	16	Read only
6	Digital output D status (Gen)	0	1	16	Read only
7	Digital output C status (Mains)	0	1	16	Read only

B. 75XX 的自定义输出地址的算法：自定义输入地址都是相同的，为 13*256+13=3345，通过地址里的高低位来触发对应输入是否有效；

■ 10.14 Page 13 - Diagnostic - Digital Outputs

17	Unnamed digital output 1	De-energised	Energised			16/16
	Unnamed digital output 2	De-energised	Energised			15/16
	Unnamed digital output 3	De-energised	Energised			14/16
	Unnamed digital output 4	De-energised	Energised			13/16
	Unnamed digital output 5	De-energised	Energised			12/16
	Unnamed digital output 6	De-energised	Energised			11/16
	Unnamed digital output 7	De-energised	Energised			10/16
	Unnamed digital output 8	De-energised	Energised			9/16
	Unnamed digital output 9	De-energised	Energised			8/16
	Unnamed digital output 10	De-energised	Energised			7/16
	Unnamed digital output 11	De-energised	Energised			6/16
	Unnamed digital output 12	De-energised	Energised			5/16
	Unnamed digital output 13	De-energised	Energised			4/16
	Unnamed digital output 14	De-energised	Energised			3/16
	Unnamed digital output 15	De-energised	Energised			2/16
	Unnamed digital output 16	De-energised	Energised			1/16

燃油和启动地址在 PAGE 13 页中的偏移量为 0 的地址中；

Registers

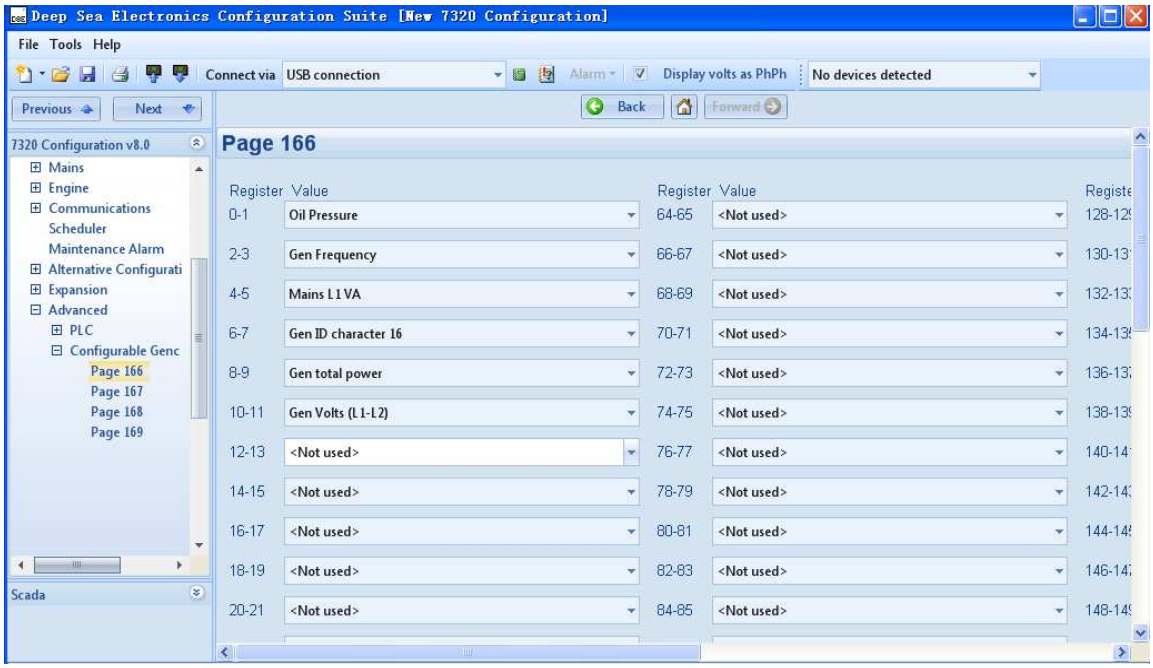
Register offset	Name	Minimum value	Maximum value	Scaling factor	Units	Bits/ Sign
0	Fuel relay	0	3			15/16-16/16
	Start relay	0	3			13/16-14/16
	Mains loading relay	0	3			11/16-12/16
	Generator loading relay	0	3			9/16-10/16

二、目前 73XX 和 8000 系列模块可通过深海的设置软件计算出寄存器的地址，比通过 Modbus 通讯协议文档中计算相应寄存器的地址更方便

①当上位机或第三方软件监控发电机组中间过程状态时，软件中提供一个 Virtual LED 专门用于提供发电机组中间量的寄存器地址，如下图所示：

中间状态量寄存器的地址是：191*256+偏移地址(偏移地址从 0 1 2 3 …)

②除中间状态量以外的寄存器地址，如仪表显示、控制按钮和报警的寄存器地址，深海都把它归到相应的页码下 P166-169,在软件中选择不同的功能，可马上算出相应的地址，如下图所示：



在 P166 页面上寄存器地址的算法：166*256+偏移地址(偏移地址从 0 1 2 3 …)

在 P167 页面上寄存器地址的算法：167*256+偏移地址(偏移地址从 0 1 2 3 …)

在 P168 页面上寄存器地址的算法：168*256+偏移地址(偏移地址从 0 1 2 3 …)

在 P169 页面上寄存器地址的算法：169*256+偏移地址(偏移地址从 0 1 2 3 …)

如对深海控制器远程通讯 Modbus 地址表功能说明有任何疑问，请联系：

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