DEX-100

Software User Manual for Modules (DDS, REST, Modbus) and Edge Server

Version 1.1



Revision History

Revision	Date	Changes	Prepared by
0.1	08/23/2017	Create draft document	Steven Tu
0.2	09/19/2017	New add installation, DDS, Modbus and Edge Server	Steven Tu
		chapter	
0.3	10/23/2017	New add Rest new API and Fix some picture error	Steven Tu
0.4	11/15/2017	1.Support JSON format on Rest API	Steven Tu
		2.Add Java and Python post function sample	
0.5	06/12/2018	New REST API to get the DEX-Pro status	Steven Tu
0.6	11/20/2018	Fix the post function example	Steven Tu
0.7	03/28/2018	Fix the duplicated section 3.1.4	Steven Tu
1.0	10/01/2019	Add the access OCR table, execute/stop script and keep	Steven Tu
		the message data rest API	
1.1	09/07/2020	Add some limitation note for OCR restful API	

Software User Manual for DEX-100 V1.0



List of Contents

1. INTRODUCTION	5
2. INSTALLATION	5
	5
2 2 EDGE SERVER VORTEX OF ENDERLE (THE DEFAULT IMAGE IS ALREADY INCLUDED)	۵
3. REST MODULE	11
3.1 REST API	
3.1.1 LIGHTCOLOR	
3.1.1.1 LIGHTCOLOR XML FORMAT	
3.1.1.2 LIGHTCOLOR JSON FORMAT	
3.1.2 WARNINGMSG	
3.1.2.1 WARNINGMSG XML FORMAT	
3.1.2.1 WARNINGMSG JSON FORMAT	
3.1.3 AlarmMsg	
3.1.3.1 ALARMMSG XML FORMAT	
3.1.3.2 ALARMMSG JSON FORMAT	
3.1.4 MACHINESTATUS	
3.1.4.1 MACHINESTATUS XML FORMAT	
3.1.4.2 MACHINESTATUS JSON FORMAT	
3.1.5 SPTSTATUS	
3.1.5.1 SptStatus XML format	
3.1.5.2 SptStatus JSON FORMAT	
3.1.6 SYSMODE	
3.1.6.1 SysMode XML FORMAT	
3.1.6.2 SYSMODE JSON FORMAT	
3.1.7 MESSAGE	
3.1.7.1 MESSAGE JSON FORMAT	
3.1.8 SCRIPT	
3.1.8.1 EXECUTESCRIPT JSON FORMAT	
3.1.8.2 STOPSCRIPT JSON FORMAT	
3.1.9.1 SETOCRDATA JSON FORMAT	
3.1.9.2 GETOCRUATA JSON FORMAT	
3.2 WRITING WEB SERVICES CLIENT APPLICATIONS	
3.2.1 C#	
2.2.2 JAVA	
5.2.5 PTTHON	
4. DDS MODULE	34
4.1 DDS IDL	
5. MODBUS MODULE	37
5.1 Modbus Function	
5.1.1 READ COIL STATUS	
5.1.2 READ INPUT STATUS	
5.1.3 Read Holding Registers	
5.1.4 READ INPUT REGISTERS	
5.1.5 Force Single Coil	
5.1.6 Preset Single Register	
5.1.7 Force Multiple Coils	
5.1.8 Force Multiple Coils	
5.2 MODBUS REST API ERROR MESSAGE REFERENCE	
6. EDGE SERVER	53
	F.3
UII JIANIINU EDUE JERVER FRUURAIVI	

Software User Manual for DEX-100 V1.0

3/55



Software User Manual for DEX-100 V1.0

4/55



1. Introduction

There are three modules as services in DEX-100. They are DDS, REST and Modbus modules. We simply go through the three modules main purposes as follows. Every modules are introduced in detail in the later chapters.

- DDS Module: It accepts the DEX-100 main program data and publish the four topics data on DDS.
- REST Module: The same, it accepts the DEX-100 main program data and provides the rest api to let user program to get the lastest data from DEX-100.
- Modbus Module: It is the modbus master, provides the modbus tcp and rtu for FC1,2,3,4,5,6,15,16 and also supports swap word and registers functions to get the modbus slave data and reply to DEX-100 main program.

For the Edge Server, it is a composite of main program and MySQL database. The main purposes are as follows.

- Main Program: It subscribes DDS data, parses the dynamic parameters of machine status and translate to database data.
- MySQL database: It provides the simple way to make user access every DEX-100's data on four topics. Users only use the SQL instructions to filter data, get data, and etc. Easy to use to integrate with other IT system, e.g. MES, ALM and etc.

2. Installation

2.1 DEX-100 Vortex OpenSplice

If you want to use the DDS Module, it can start by the DEX-100 main program. Please refer to the DEX-100 main program manual. Before you start the DDS Module, you have to check the Vortex OpenSplice already existing.

1. Install the JRE x64 version

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racle Technology Network / J	ava / Java SE / Downloads			
Java SE Java EE Java ME Java SE Advanced & Suite Java Embedded Java DB Web Tier Java Card	Overview Downloads Docume Java SE Runtime Envir Do you want to run Java TM program Java programs, but not develop ther If you want to develop applications fi includes the JRE, so you do not hav JRE 8u144 Checksum	comment 8 E s, or do you want t n, download the Ja or Java, download bot	unity Technologies Training Cownloads o develop Java programs? If you want to run ava Runtime Environment, or JRE™. the Java Development Kit, or JDK™. The JDK h separately.	Java SDKs and Tools Java SE Java EE and Glassfish Java ME Java ME Vata Card NetBeans IDE Java Mission Control Java Resources
Java TV New to Java Community Java Magazine	Java SE F You must accept the Oracle Bin O Accept Licer	Runtime En ary Code License software	vironment 8u144 e Agreement for Java SE to download this e. Decline License Agreement	Java APIs Technical Articles Demos and Videos Eorums
	Product / File Description Linux x86 Linux x86 Linux x84 Mac OS X Mac OS X Solaris SPARC 64-bit Solaris x64 Windows x86 Offline Windows x86 Offline Windows x86 Offline Windows x86 Offline	File Size 59,13 MB 75,01 MB 56,44 MB 72,41 MB 63,94 MB 55,56 MB 52,12 MB 49,95 MB 0,7 MB 54,57 MB 62,24 MB 62,24 MB 63,99 MB	Download Ire-But 144-linux-1686.trg 2 Ire-But 144-linux-1686.trg 2 Ire-But 144-linux-1686.trg 2 Ire-But 144-linux-1686.trg 2 Ire-But 144-macosx-844.trg 2 Ire-But 144-macosx-846.trg 2 Ire-But 144-macosx-846.trg 2 Ire-But 144-macosx-866.trg 2 Ire-But 144-windows-1686.targ 2 Ire-But 144-windows-1686.targ 2 Ire-But 144-windows-866.targ 2 Ire-But 144-windows-864.targ 2	Java Magazine Java.net Java.net Developer Training Tutorials Java.com

Software User Manual for DEX-100 V1.0



2. Set the environment PATH

系統內容 ★統內容 ★ 100 / 150 /	- 4→ 援尋控制
电脑名稱 雙燈 ^{建內} 系統体護 逐漸 您必須以系統管理員的身分登入,才能使執行這些變更。 效能 視覺效果、處理器排程、記憶體使用量和虛擬記憶體 設定(3) 使用者設定檔 關於您登入時的桌面設定	環境變數 Super 的使用者變數(U) <u> 變數 値</u> LITE_HOME C:\Program Files\PrismTech/Vortex_v2/D LITE_HOST win32_cl_x64 Path C:\Program Files (x86)\Microsoft VS Co TEMP %IISERPROFILE%AnnData\Local\Temm
設定(E) - -	新增(M) 編輯(E) 刪除(D) 今統變數(3) JAVA_HOME set your JRE installation location 變數 JAVA_HOME C:Program Files\Java\jre1.8.0_141 MOSQUITTO_D C:Program Files (x86)\mosquitto NUMBER_OF_P 4 OPENSSL CONF C:VonenSSL-Win32\hin\onenssl cfg 新增(W) 編輯(I) 刪除(L)
□ 確定 取消 套用(A)	確定 取消

3. Install the Vortex OpenSplice

Remember to choose "YES" in the installation process "Set-up OpenSplice Environment Variables"

🕷 Setup	
Set-up OpenSplice Environment Variables	
Do you wish to set the Vortex OpenSplice configuration environm for this installation for all users? This includes adding this Vortex O installation to the search PATH and making this installation the de Note: this is required if you wish to configure the OpenSplice dae Windows Service.	ent variable values penSplice fault for all users. mon to run as a
Warning: this will overwrite any Vortex OpenSplice Environment va users in the same manner from previous installations.	ariables set for all
• Yes	
© No	
InstallBuilder	
< Back Next >	Cancel

4. Open the OpenSplice Launcher

Software User Manual for DEX-100 V1.0





5. Click the "Configurations" and set up the ospl_shmem_ddsi (ospl_shmem_ddsi2e.xml)

🚸 Pl	RISMTECH AN A DILINIK COMPANY			×** ?*
Tools	ospl_sp_ddsi (ospl.xml) ospl_shmem_ddsi (ospl_shmem_ddsi.xml) ospl_shmem_ddsi (ospl_shmem_ddsi2e.xml)			
Controls	ospl_shmem_nativeRT (ospl_shmem_nativeRT.xml) ospl_shmem_nativeRT_ddsi_bridge (ospl_shmem_nativeRT_ddsi_bridge.xml) ospl_shmem_no_network (ospl_shmem_no_network.xml)			
Configurations	ospl_shmem_secure_nativeRT (ospl_shmem_secure_nativeRT.xml) ospl_sp_ddsi (ospl_sp_ddsi.xml) ospl_sp_ddsi_10gbps (ospl_sp_ddsi_10gbps.xml)			~
Documentation	Description Federated deployment using shared- memory and extended DDSI networking.	Ċ	Ø	ø
Examples				
ospl_sp_ddsi v	with ID 0	in		9 @ /

6. You need to set the domain id, if you want to make the dds program in the same scope (e.g. DDS module and Edge Server DDS program. If you let DDS and Edge Server DDS program, you must set the same domain id.)



🔁 Vortex OpenSplice Configurator C:\Program Files\Pri	smTech\Vortex_v2\Device\VortexOper	nSplice\6.8.0p1\HDE\x
<u>F</u> ile <u>E</u> dit <u>H</u> elp		
Domain DDSI2EService[name=ddsi2e] DurabilityS	Service[name=durability] TunerServi	ice[name=cmsoap]
Pomain ■ Database ■ Service[name=ddsi2e] ■ Service[name=durability] ■ Service[name=cmsoap]	Name Id Description	Value ospl_shmem_ddsi 0 Federated deployment using shared
Elements		Attributes
The Domain service is responsible for creating and to manage a specific DDS Domain on a computing able to participate in a DDS Domain.	d initialising the DDS database whi node. Without this administration,	ch is used by the administration no other service or application is
Once the administration has been initialised, the D the started services is under control of the Domain services, take corrective actions if needed and sto	oomain service starts the set of plug o service, which means it will monito p the services when it is terminated	ggable services. The lifecycle of or the health of all started d.
Documentation for '//OpenSplice/Domain'		
Ready		

7. Copy others config files to other folder and change the ospl_shmem_ddsi2e.xml to ospl.xml

COOv 📔 « Vortex	DpenSplice ▶ 6.8.0p1 ▶ HDE ▶ :	x86_64.win64 🕨 etc 🕨 config 🕨	▼ 4y 複尋 config	7	>
組合管理 ▼ 加入至約	某體櫃 ▼ 共用對象 ▼ 焼錄	新増資料夾		iii • 🔟 🤇	0
★ 我的最愛 下#	名稱 A稱	修改日期 類型	大小		
■ 桌面 最近的位置	ospl_shmem_ddsi2e.xml	Only reserve the ospl_shmem_dd	si2e.xml and change		
COV 🛛 « Vortext	OpenSplice , 6.8.0p1 , HDE , :	x86_64.win64 → etc → config →	▼ 4y 搜尋 config		2
 ● ● ● ● ● ● ● ● ● Vortext 組合管理 ▼ 加入至後 	DpenSplice ▶ 6.8.0p1 ▶ HDE ▶ > 黑體櫃 ▼ 共用對象 ▼ 燒錄	x86_64.win64 ▶ etc ▶ config ▶ 新増資料夾	▼ 4 Ĵ 搜尋 config		2
George Context Hade管理 ● 加入至 加入至 和人至 和人至 和人至 和人至 和人至 和人 和	DpenSplice → 6.8.0p1 → HDE → ; 課題櫃 ▼ 共用對象 ▼ 燒錄 名稱 ^	x86_64.win64 ▶ etc ▶ config ▶ 新増資料夾 修改日期 類型	 ◆ ◆ 〕 援募 config 大小 		2

8. Refresh the configuration and set ospl.xml to default configuration

Software User Manual for DEX-100 V1.0



🔅 Pl		×≈ ? *
Tools	ospl_shmem_ddsi (ospl.xml)	
Controls		
Configurations		
Documentation	Description	C 🕑 🖋
Examples		
🖒 ospl_shmem_	ddsi with ID 0 is stopped	m y m d 🦻 @ ,

9. Click to "Controls" and start the Vortex OpenSplice

- 🏇 PI	RISMTECH		Start Vo	ortex OpenSplice				
Tools			Starting Info log Error log	up domain "ospl_shme 9 : .\ospl- info.log 9 : .\ospl- error.log	m_ddsi" w	ith ID 1	0	
Controls		Start Vortex OpenSp	lice	Stop Vortex OpenSplice				
Documentation								
Examples								
🖒 ospl_shmem_	ddsi with ID 10 is operational				^ † Y	in		@ //

2.2 Edge Server Vortex OpenSplice (The default image is already included)

In the previous section, we mention that if we want to DEX-100 DDS module and Edge Server program working normally, we shall set the Edge Server Vortex OpenSplice in the same domain id and the same configuration. We will set the confiuration and start the Vortex OpenSplice step by step as follow.

Software User Manual for DEX-100 V1.0



1. Open the terminal and change dictionary to configuration location "cd /opt/Prismtech/Vortex v2/Device/VortexOpenSplice/6.8.0/HDE/x86 64.linux/etc/config"



2. Edit the ospl.xml domain id "sudo gedit ospl.xml" and save

```
dexserver@dexserver-MXE5500:/opt/PrismTech/Vortex_v2/Device/VortexOpenSplice/6.8
.0/HDE/x86_64.linux/etc/config$ ls
ospl.xml
dexserver@dexserver-MXE5500:/opt/PrismTech/Vortex_v2/Device/VortexOpenSplice/6.8
.0/HDE/x86_64.linux/etc/config$
```

3. Start the Vortex OpenSplice "ospl start"

```
  dexserver@dexserver-MXE5500: ~

  dexserver@dexserver-MXE5500: ~$
  starting up domain "ospl_shmem_ddsi" with ID 0

  Info log : ./ospl-info.log
  Error log : ./ospl-error.log
  dexserver@dexserver-MXE5500:~$
```



3. REST Module

We defined the four API categories to support DEX-100 data extraction; they are "LightColor", "WarningMsg", "AlarmMsg", "MachineStatus", as one of the service in DES (Data Extraction Service). When you start the REST Module in the DEX-100 main program, you can use the REST API to get latest data. The details are as follow section:



3.1 REST API

When DEX-100 main program extracts data, it will send data to the REST Module and the data will keep the latest data in the REST module. In order to make user retrieve data easily, REST module provides many REST APIs as follows:

3.1.1 LightColor

3.1.1.1 LightColor XML format [URI] http://hostname:port/sublightcolor

[Content-Type] text/xml

[Request]

<?xml version="1.0" encoding="UTF-8"?>

<DES>

<LightColor>

<SubDataType>RAW_DATA</SubDataType>

Software User Manual for DEX-100 V1.0

11/55



</LightColor>

</DES>

[Explanation]

<SubDataType>RAW_DATA</SubDataType>

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

<?xml version="1.0" encoding="UTF-8"?>

<DES>

<LightColor>

<machine_id>20</machine_id>

<date>20170502</date>

<time>12:00:00</time>

<color>YELLOW</color>

<response>Success</response>

</LightColor>

</DES>

3.1.1.2 LightColor JSON format [URI] http://hostname:port/sublightcolor

[Content-Type] application/json

[Request]

```
{
   "DES": {
    "LightColor": { "SubDataType": "RAW_DATA" }
  }
}
```

[Explanation]

"SubDataType": "RAW_DATA"

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now

Software User Manual for DEX-100 V1.0

12/55

RAW_DATA only)



[Response]

```
{
    "DES": {
        "LightColor": {
            "machine_id": "20",
            "date": "20170502",
            "time": "12:00:00",
            "color": "YELLOW",
            "response": "Success"
        }
    }
}
```

3.1.2 WarningMsg

[Description]

The subwarningmsg is to get data by rest and it doesn't clean the warning message data when call this API. In another way, we provide the takewarningmsg to get data and clean the data to NaN immediately when getting warning message successfully.

3.1.2.1 WarningMsg XML format

[URI] http://hostname:port/subwarningmsg

[Content-Type] text/xml

[Request]

<?xml version="1.0" encoding="UTF-8"?>

<DES>

<WarningMsg>

<SubDataType>RAW_DATA</SubDataType>

</WarningMsg>

</DES>

[Explanation]

<SubDataType>RAW_DATA</SubDataType>

Software User Manual for DEX-100 V1.0

13/55



--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

```
<DES>
<WarningMsg>
<machine_id>30</machine_id>
<date>20170502</date>
<time>12:00:00</time>
```

 $<\!\!msg_num\!\!>\!\!TD1000\!<\!\!/msg_num\!\!>$

<msg>Not Enough Energy</msg>

<response>Success</response>

<?xml version="1.0" encoding="UTF8"?>

</WarningMsg>

```
</DES>
```

[URI] http://hostname:port/takewarningmsg

[Content-Type] text/xml

[Request]

<?xml version="1.0" encoding="UTF-8"?>

<DES>

<WarningMsg>

<SubDataType>RAW_DATA</SubDataType>

</WarningMsg>

</DES>

[Explanation]

<SubDataType>RAW_DATA</SubDataType>

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

Software User Manual for DEX-100 V1.0

14/55



```
<?xml version="1.0" encoding="UTF8"?>
<DES>
```

<WarningMsg>

<machine_id>30</machine_id>

<date>20170502</date>

<time>12:00:00</time>

<msg_num>TD1000</msg_num>

<msg>Not Enough Energy</msg>

<response>Success</response>

</WarningMsg>

</DES>

3.1.2.1 WarningMsg JSON format [URI] http://hostname:port/subwarningmsg

[Content-Type] application/json

[Request]

```
{
    "DES": {
        "WarningMsg": { "SubDataType": "RAW_DATA" }
    }
}
```

[Explanation]

```
"SubDataType": "RAW_DATA"
--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)
```

[Response]

"DES": {

{

Software User Manual for DEX-100 V1.0

15/55



```
"WarningMsg": {
    "machine_id": "30",
    "date": "20170502",
    "time": "12:00:00",
    "msg_num": "TD1000",
    "msg": "Not Enough Energy",
    "response": "Success"
  }
}
```

[URI] http://hostname:port/takewarningmsg

[Content-Type] application/json

[Request]

```
{
   "DES": {
    "WarningMsg": { "SubDataType": "RAW_DATA" }
  }
}
```

[Explanation]

"SubDataType": "RAW_DATA"

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

Software User Manual for DEX-100 V1.0

16/55



```
"date": "20170502",
"time": "12:00:00",
"msg_num": "TD1000",
"msg": "Not Enough Energy",
"response": "Success"
}
}
```

3.1.3 AlarmMsg

[Description]

The subalarmmsg is to get data by rest and it doesn't clean the warning message data when call this API. In another way, we provide the takealarmmsg to get data and clean the data to NaN immediately when getting alarm message successfully. [URI]

3.1.3.1 AlarmMsg XML format

[URI] http://hostname:port/subalarmmsg

[Content-Type] text/xml

[Request]

```
<?xml version="1.0" encoding="UTF-8"?>
```

<DES>

<AlarmMsg>

 $<\!\!SubDataType\!\!>\!\!RAW_DATA\!<\!\!/SubDataType\!\!>$

</AlarmMsg>

</DES>

[Explanation]

```
<SubDataType>RAW_DATA</SubDataType>
```

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

<?xml version="1.0" encoding="UTF8"?>

Software User Manual for DEX-100 V1.0

17/55



<DES>

<AlarmMsg>

 $<\!\!machine_id\!\!>\!\!15<\!\!/machine_id\!\!>$

<date>20170502</date>

<time>12:00:00</time>

<major>X199</major>

<minor>Y20</minor>

<msg>Error Arm</msg>

<response>Success</response>

</AlarmMsg>

</DES>

[URI] http://hostname:port/takealarmmsg

[Content-Type] text/xml

[Request]

<?xml version="1.0" encoding="UTF-8"?>

<DES>

<AlarmMsg>

<SubDataType>RAW_DATA</SubDataType>

</AlarmMsg>

</DES>

[Explanation]

<SubDataType>RAW_DATA</SubDataType>

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

<?xml version="1.0" encoding="UTF8"?>

<DES>

<AlarmMsg>

<machine_id>15</machine_id>

Software User Manual for DEX-100 V1.0

18/55



<date>20170502</date>

<time>12:00:00</time>

<major>X199</major>

<minor>Y20</minor>

<msg>Error Arm</msg>

<response>Success</response>

</AlarmMsg>

</DES>

3.1.3.2 AlarmMsg JSON format [URI] http://hostname:port/subalarmmsg

[Content-Type] application/json

[Request]

```
{
   "DES": {
    "AlarmMsg": { "SubDataType": "RAW_DATA" }
  }
}
```

[Explanation]

```
"SubDataType": "RAW_DATA"
```

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

{
 "DES": {
 "AlarmMsg": {
 "machine_id": "15",
 "date": "20170502",
 "time": "12:00:00",
 "major": "X199",

Software User Manual for DEX-100 V1.0

19/55



```
"minor": "Y20",
    "msg": "Error Arm",
    "response": "Success"
    }
}
```

[URI] http://hostname:port/takealarmmsg

[Content-Type] application/json

[Request]

```
{
   "DES": {
    "AlarmMsg": { "SubDataType": "RAW_DATA" }
  }
}
```

[Explanation]

```
"SubDataType": "RAW_DATA"
```

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

{	
"DES": {	
"AlarmMsg": {	
"machine_id": "15",	
"date": "20170502",	
"time": "12:00:00",	
"major": "X199",	
"minor": "Y20",	
"msg": "Error Arm",	
"response": "Success"	

Software User Manual for DEX-100 V1.0

20/55



}
}

3.1.4 MachineStatus 3.1.4.1 MachineStatus XML format [URI] http://hostname:port/submachinestatus

[Content-Type] text/xml

[Request]

<?xml version="1.0" encoding="UTF-8"?>

<DES>

<MachineStatus>

<SubDataType>RAW_DATA</SubDataType>

</MachineStatus>

</DES>

[Explanation]

<SubDataType> </SubDataType>

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

<?xml version="1.0" encoding="UTF8"?>

<DES>

<MachineStatus>

<machine_id>11</machine_id>

<date>20170502</date>

<time>12:00:00</time>

 $<\!\!descriptors\!\!>\!\!Complete_PWB,\!Attempted_Pickup_Missed_Pickup_Errors,\!Abnormal_Pickup_Errors,\!Recogition_Errors,\!Abnormal_Pickup_Errors,\!Recogition_Errors,\!Successful_Pickup_Rate,\!Machine_Troubles,\!Operation_Time,\!Mounting_Time,\!Stopped_Time<\!/descriptors>$

Software User Manual for DEX-100 V1.0

21/55



<datatypes>u8,u8,u8,u16,u16,f64,u16,str,str,str</datatypes>

 $<\!\!values\!\!>\!\!11,\!50,\!50,\!0,\!0,\!100.0,\!0,\!15H33M16S,\!15H33M16S,\!15H33M16S<\!\!/values\!\!>\!$

<response>Success</response>

</MachineStatus>

</DES>

3.1.4.2 MachineStatus JSON format [URI] http://hostname:port/submachinestatus

[Content-Type] application/json

[Request]

```
{
  "DES": {
    "MachineStatus": { "SubDataType": "RAW_DATA" }
 }
}
```

[Explanation]

"SubDataType": "RAW_DATA"

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

{

"DES": {

"MachineStatus": {

"machine_id": "11",

"date": "20170502",

"time": "12:00:00",

"descriptors": "Complete_PWB,Attempted_Pickup,Missed_Pickup_Errors,Abnormal_Pickup_Error s,Recogition_Errors,Abnormal_Pickup_Errors,Recogition_Errors,Successful_Pickup_Rate,Machine_Trouble s,Operation_Time,Mounting_Time,Stopped_Time",

"datatypes": "u8,u8,u8,u16,u16,f64,u16,str,str,str",

Software User Manual for DEX-100 V1.0

22/55



```
"values": "11,50,50,0,0,100.0,0,15H33M16S,15H33M16S,15H33M16S",
    "response": "Success"
    }
}
```

3.1.5 SptStatus

3.1.5.1 SptStatus XML format [URI] http://hostname:port/subsptstatus

[Content-Type] text/xml

[Request]

<?xml version="1.0" encoding="UTF-8"?>

<DES>

<SptStatus>

<SubDataType>RAW_DATA</SubDataType>

</SptStatus>

</DES>

[Explanation]

<SubDataType> </SubDataType>

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

```
<?xml version="1.0" encoding="UTF8"?>
<DES>
<SptStatus>
<date>20180612</date>
<date>20180612</date>
<date>12:00:00</time>
<dspt_cmd_step>1</spt_cmd_step>
<spt_cmd_name>Connect</spt_cmd_name>

Software User Manual for DEX-100 V1.0 23/55
```



<response>Success</response>

</SptStatus>

</DES>

3.1.5.2 SptStatus JSON format [URI] http://hostname:port/subsptstatus

[Content-Type] application/json

[Request]

```
{
    "DES": {
        "SptStatus": { "SubDataType": "RAW_DATA" }
    }
}
```

[Explanation]

"SubDataType": "RAW_DATA"

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

```
{
    "DES": {
        "SptStatus": {
            "date": "20180612",
            "time": "12:00:00",
            "spt_cmd_step": "1",
            "spt_cmd_name": "Connect",
            "response": "Success"
        }
    }
}
```

Software User Manual for DEX-100 V1.0

24/55



3.1.6 SysMode 3.1.6.1 SysMode XML format [URI] http://hostname:port/subsysmode

[Content-Type] text/xml

[Request]

<?xml version="1.0" encoding="UTF-8"?>

<DES>

<SysMode>

<SubDataType>RAW_DATA</SubDataType>

</SysMode>

</DES>

[Explanation]

```
<SubDataType> </SubDataType>
```

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

```
<?xml version="1.0" encoding="UTF8"?>
```

<DES>

<SysMode>

<date>20180612</date>

<time>12:00:00</time>

<mode>1</mode>

<response>Success</response>

</SysMode>

</DES>

[Explanation]

<*Mode> 1 </Mode>* 1: Data Extraction Mode

2: Full Control Mode

Software User Manual for DEX-100 V1.0

25/55



3.1.6.2 SysMode JSON format [URI] http://hostname:port/subsysmode

[Content-Type] application/json

[Request]

```
{
   "DES": {
    "SysMode": { "SubDataType": "RAW_DATA" }
  }
}
```

[Explanation]

```
"SubDataType": "RAW_DATA"
```

--- the subscribe data type of DEX-series, it may be RAW_DATA, ANA_DATA and etc.(Now RAW_DATA only)

[Response]

```
{
    "DES": {
        "SysMode": {
            "date": "20180612",
            "time": "12:00:00",
            "mode": "1",
            "response": "Success"
        }
    }
}
```

[Explanation]

"SubDataType": "1" 1: Data Extraction Mode

2: Full Control Mode

Software User Manual for DEX-100 V1.0

26/55



3.1.7 message 3.1.7.1 message JSON format [URI] http://hostname:port/message

[Method] POST

[Content-Type] application/json

[Request]

"message": "test",

"messageTitle": "test",

"enterFullOperationWhenClosed": 1

}

{

[Response]

{
 "DES": {
 "response":"Send [Message] topic ok"
 }
}

[URI] http://hostname:port/message

[Method] GET

[Content-Type] application/json

[Request] **No body**

Software User Manual for DEX-100 V1.0

27/55



[Response]

```
{
    {
        {
            "message": "test",
            "messageTitle": "test",
            "enterFullOperationWhenClosed": 1
        },
        {
            "message": "test",
            "messageTitle": "test",
            "messageTitle": "test",
            "enterFullOperationWhenClosed": 2
        },
    }
}
```

```
[URI]
http://hostname:port/message
```

[Method] **DELETE**

[Content-Type] application/json

[Request] No body

[Response]

```
{
```

```
"DES": {
```

"response":"Delete [Message] topic ok"

}

}

3.1.8 Script

3.1.8.1 executescript JSON format [URI] http://hostname:port/exectuescript/#

Software User Manual for DEX-100 V1.0

28/55



[Method] POST

[Content-Type] application/json

[Request] **No body**

[Response]

"ErrorCode": 0

}

{

3.1.8.2 stopscript JSON format [URI] http://hostname:port/stopscript

[Method] POST

[Content-Type] application/json

[Request] **No body**

[Response]

{ "ErrorCode": 0

}

3.1.9 OCR table value

3.1.9.1 setocrdata JSON format [URI] http://hostname:port/setocrdata

Software User Manual for DEX-100 V1.0

29/55



[Method] POST

[Content-Type] application/json

```
[Request]
{
    "OCRID": "2",
    "OCRValue": "abcd"
}
```

[Response]

"ErrorCode": 0

[Note]

{

}

- 1. The index 0 is not accessible.
- 2. The response time is about 200ms once

3.1.9.2 getocrdata JSON format

[URI] http://hostname:port/getocrdata/#

[Method] GET

[Content-Type] application/json

[Request] No body

[Response]

{

```
"ErrorCode": 0,
"ECItem": [
{
"ECID": 2,
"ECValue": "abcd"
```

Software User Manual for DEX-100 V1.0

30/55



```
}
}
```

[Note] The index 0 is not accessible.

3.2 Writing Web Services Client Applications

This section briefly describes how to write a web service client to get data. It is divided by programming language.

3.2.1 C#

{

[POST Procedure]

```
You have to pass two parameters in postXMLData,
The first parameter is URL, it likes "<u>http://127.0.0.1:8888/sublightcolor</u>"
and second is xml data, it likes
```

```
"<?xml version="1.0" encoding="UTF-8"?>
<DES>
<LightColor>
<SubDataType>RAW_DATA</SubDataType>
</LightColor>
</DES>"
```

```
public string postXMLData(string destinationUrl, string requestXml)
```

```
HttpWebRequest request = (HttpWebRequest)WebRequest.Create(destinationUrl);
byte[] bytes;
bytes = System.Text.Encoding.ASCII.GetBytes(requestXml);
request.ContentType = "text/xml";
request.ContentLength = bytes.Length;
request.Method = "POST";
Stream requestStream = request.GetRequestStream();
requestStream.Write(bytes, 0, bytes.Length);
requestStream.Close();
HttpWebResponse response;
response = (HttpWebResponse)request.GetResponse();
if (response.StatusCode == HttpStatusCode.OK)
{
Stream responseStream = response.GetResponseStream();
string responseStr = new StreamReader(responseStream).ReadToEnd();
return responseStr;
}
```

Software User Manual for DEX-100 V1.0



return null;

3.2.2 JAVA

}

[POST Procedure] **Apache HttpClient Package** You have to pass two parameters in postXMLData, The first parameter is URL, it likes "<u>http://127.0.0.1:8888/sublightcolor</u>" and second is xml data, it likes

```
public string postXMLData(string destinationUrl, string requestXml)
```

```
{
DefaultHttpClient httpClient = new DefaultHttpClient();
HttpPost postRequest = new HttpPost(destinationUrl);
StringEntity input = new StringEntity(requestXml);
input.setContentType("text/xml");
postRequest.setEntity(input);
HttpResponse response = httpClient.execute(postRequest);
int code = response.getStatusLine().getStatusCode();
String body = EntityUtils.toString(response.getEntity());
return body;
}//for 200 ok only
```

3.2.3 Python

[POST Procedure] **urllib package** You have to pass two parameters in postXMLData, The first parameter is URL, it likes "<u>http://127.0.0.1:8888/sublightcolor</u>" and second is xml data, it likes

```
"<?xml version="1.0" encoding="UTF-8"?>
<DES>
<LightColor>
<SubDataType>RAW_DATA</SubDataType>
</LightColor>
</DES>"
```

```
method = "POST"
handler = urllib2.HTTPHandler()
```

Software User Manual for DEX-100 V1.0

32/55



```
opener = urllib2.build_opener(handler)
#xml setting
data = urllib.urlencode(dictionary_of_POST_fields_or_None)
#url setting
request = urllib2.Request(url, data=data)
request.add_header("Content-Type",'text/xml')
request.get_method = lambda: method
try:
    connection = opener.open(request)
except urllib2.HTTPError,e:
    connection = e
if connection.code == 200:
#get response xml data
    data = connection.read()
else:
    # handle the error case. connection.read() will still contain data
```



4. DDS Module

The DDS Module also defined four DDS topic in the idl. They are "LightColor", "WarningMsg", "AlarmMsg", "MachineStatus", as one of the service in DES (Data Extraction Service). When you start the DDS Module in the DEX-100 main program, you can write a DDS subscriber to retrieve data. The details are as follow section:



4.1 DDS IDL

If you want to retrieve the DEX-100 extraction data, you have to need the DES.idl on your DDS subscriber program. The DES.idl is as follows:

```
module DES
{
    struct TableSchema
    {
        unsigned short machine_id;
        unsigned short para_length;
        string value;
    };
    #pragma keylist TableSchema
    struct LightColor
```

Software User Manual for DEX-100 V1.0

34/55



unsigned short machine_id;

string date;

string time;

string color;

};

{

#pragma keylist LightColor machine_id

struct WarningMsg

{

unsigned short machine_id;

string date;

string time;

string msg_num;

string msg;

};

#pragma keylist WarningMsg machine_id

```
struct AlarmMsg
```

{

unsigned short machine_id;

string date;

string time;

string major;

string minor;

string msg;

};

#pragma keylist AlarmMsg machine_id

struct MachineStatus

Software User Manual for DEX-100 V1.0

35/55



	ſ	
	ĩ	
		unsigned short machine_id;
		string date;
		string time;
		string descriptors;
		string datatypes;
		string values;
	};	
	#pra	gma keylist MachineStatus machine_id
};		

Software User Manual for DEX-100 V1.0

36/55



5. Modbus Module

Modbus Module support most main Modbus functions to access Modbus devices. It can only use the DEX-100 main program to link Modbus module to access data or write a simple web service client program to retrieve Modbus device data which connected on DEX-100 (RTU) or in the same scope network (TCP).



5.1 Modbus Function

This section list the support Modbus function and the exchange XML format

5.1.1 Read Coil Status

```
[URI]
http://hostname:port/fc1
```

[Request] TCP connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>TCP</connectionType>

<ip>127.0.0.1</ip>

<port>502</port>

<slave>1</slave>

<dataType>UINT8</dataType>

 $<\!\!startAddress\!\!>\!\!1<\!\!/startAddress\!\!>$

Software User Manual for DEX-100 V1.0

37/55



<length>5</length>

```
</ModbusService>
```

RTU connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>RTU</connectionType>

<device>\\.\COM12</device>

<baud>115200</baud>

<parity>N</parity>

<dataBit>8</dataBit>

<stopBit>1</stopBit>

<slave>1</slave>

<dataType>UINT8</dataType>

 $<\!\!startAddress\!\!>\!\!1<\!\!/startAddress\!\!>$

<length>1</length>

</ModbusService>

[Explanation]

<connectionType>TCP</connectionType> --- Modbus connection type, it may be TCP and RTU <ip>127.0.0.1</ip> --- TCP device IP <port>502</port> --- TCP device Port <slave>1</slave> --- Modbus Slave ID <dataType>UINT8</dataType> --- Data type, fc1 and fc2 only has UINT8 <startAddress>1</startAddress> --- Start Address on Modbus device <length>5</length> --- Length of retrieved data on Modbus device

<device><u>\\.\COM12</device</u>>

--- RTU device COM port <baud>115200</baud> --- RTU device baud rate <parity>N</parity> --- RTU device parity (N, E, O) <dataBit>8</dataBit>

Software User Manual for DEX-100 V1.0

38/55



--- RTU device data bit (5,6,7,8) <*stopBit*>1</*stopBit*> --- RTU device stop bit (1,2)

[Response]

<?xml version="1.0" encoding="UTF-8"?>

<readBits>

 $<\!\!startAddress\!\!>\!\!1<\!\!/startAddress\!\!>$

<length>5</length>

<values>0,1,0,1,0</values>

</readBits>

5.1.2 Read Input Status

[URI] http://hostname:port/fc2

[Request] TCP connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>TCP</connectionType>

<ip>127.0.0.1</ip>

<port>502</port>

<slave>1</slave>

<dataType>UINT8</dataType>

<startAddress>10000</startAddress>

<length>5</length>

</ModbusService>

RTU connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>RTU</connectionType>

<device>\\.\COM12</device>

 $<\!\!baud\!>\!\!115200\!<\!\!/baud\!>$

<parity>N</parity>

Software User Manual for DEX-100 V1.0

39/55



<dataBit>8</dataBit> <stopBit>1</stopBit>

<slave>1</slave>

<dataType>UINT8</dataType>

<startAddress>10000</startAddress>

<length>1</length>

</ModbusService>

[Explanation]

```
<connectionType>TCP</connectionType>
--- Modbus connection type, it may be TCP and RTU
<ip>127.0.0.1</ip>
--- TCP device IP
<port>502</port>
--- TCP device Port
<slave>1</slave>
--- Modbus Slave ID
<dataType>UINT8</dataType>
--- Data type, fc1 and fc2 only has UINT8
<startAddress>10000</startAddress>
--- Start Address on Modbus device
<length>5</length>
--- Length of retrieved data on Modbus device
```

```
<device>\.\.\COM12</device>
--- RTU device COM port
<baud>115200</baud>
--- RTU device baud rate
<parity>N</parity>
--- RTU device parity (N, E, O)
<dataBit>8</dataBit>
--- RTU device data bit (5,6,7,8)
<stopBit>1</stopBit>
--- RTU device stop bit (1,2)
```

[Response]

<?xml version="1.0" encoding="UTF-8"?>

<readInputBits>

<startAddress>10000</startAddress>

<length>5</length>

<values>1,0,1,0,1</values>

Software User Manual for DEX-100 V1.0

40/55



5.1.3 Read Holding Registers

[URI] http://hostname:port/fc3

[Request] TCP connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>TCP</connectionType>

<ip>127.0.0.1</ip>

<port>502</port>

<slave>1</slave>

<dataType>INT32</dataType>

<dataSwapType>SWAP_BYTE</dataSwapType>

<startAddress>0</startAddress>

<length>7</length>

</ModbusService>

RTU connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>RTU</connectionType>

 $<\!\!device\!\!>\!\!\backslash\!\backslash.\backslash\!COM12\!<\!\!/device\!\!>$

 $<\!\!baud\!>\!\!115200\!<\!\!/baud\!>$

<parity>N</parity>

<dataBit>8</dataBit>

<stopBit>1</stopBit>

<slave>1</slave>

<dataType>INT32</dataType>

<dataSwapType>SWAP_BYTE</dataSwapType>

<startAddress>0</startAddress>

<length>7</length>

</ModbusService>

Software User Manual for DEX-100 V1.0

41/55



[Explanation]

<connectionType>TCP</connectionType> --- Modbus connection type, it may be TCP and RTU <ip>127.0.0.1</ip> --- TCP device IP <port>502</port> --- TCP device Port <slave>1</slave> --- Modbus Slave ID <dataType>INT32</dataType> --- Data type, fc3 and fc4 only has UINT16, UINT32, INT16, INT32 and FLOAT32 <dataSwapType>SWAP_BYTE</dataSwapType> --- Data swap type, fc3 and fc4 For the data type UINT16 and INT16 are ORIGINAL and SWAP_BYTE For the data type UINT32, INT32 and FLOAT32 are ORIGINAL, SWAP_BYTE, SWAP_WORD and SWAP_BYTE_WORD <startAddress>0</startAddress> --- Start Address on Modbus device <length>7</length> --- Length of retrieved data on Modbus device

<device>\\.\COM12</device>
--- RTU device COM port
<baud>115200</baud>
--- RTU device baud rate
<parity>N</parity>
--- RTU device parity (N, E, O)
<dataBit>8</dataBit>
--- RTU device data bit (5,6,7,8)
<stopBit>1</stopBit>
--- RTU device stop bit (1,2)

[Response]

<?xml version="1.0" encoding="UTF-8"?>

<readRegisters>

<startAddress>0</startAddress>

<length>7</length>

<values>2560,60671,7680,-30,50,10,1376286</values>

<rawdata>00000A00,0000ECFF,00001E00,FFFFFFE2,00000032,0000000A,0015001E</rawdata>

</readRegisters>

5.1.4 Read Input Registers

[URI]

Software User Manual for DEX-100 V1.0

42/55



http://hostname:port/fc4

[Request] TCP connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>TCP</connectionType>

<ip>127.0.0.1</ip>
<port>502</port>
<slave>1</slave>
<dataType>INT32</dataType>
<dataSwapType>SWAP_BYTE</dataSwapType>
<startAddress>10000</startAddress>
<length>7</length>
</ModbusService>

RTU connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>RTU</connectionType>

<device>\\.\COM12</device>

<baud>115200</baud>

 $<\!\!parity\!\!>\!\!N<\!\!/parity\!\!>$

 $<\!\!dataBit\!\!>\!\!8<\!\!/dataBit\!\!>$

<stopBit>1</stopBit>

<slave>1</slave>

<dataType>INT32</dataType>

<dataSwapType>SWAP_BYTE</dataSwapType>

<startAddress>10000</startAddress>

<length>7</length>

</ModbusService>

[Explanation]

<connectionType>TCP</connectionType>

--- Modbus connection type, it may be TCP and RTU

Software User Manual for DEX-100 V1.0

43/55



<ip>127.0.0.1</ip> --- TCP device IP <port>502</port> --- TCP device Port <slave>1</slave> --- Modbus Slave ID <dataType>INT32</dataType> --- Data type, fc3 and fc4 only has UINT16, UINT32, INT16, INT32 and FLOAT32 <dataSwapType>SWAP_BYTE</dataSwapType> --- Data swap type, fc3 and fc4 For the data type UINT16 and INT16 are ORIGINAL and SWAP_BYTE For the data type UINT32, INT32 and FLOAT32 are ORIGINAL, SWAP_BYTE, SWAP_WORD and SWAP_BYTE_WORD <startAddress>10000</startAddress> --- Start Address on Modbus device <length>7</length> --- Length of retrieved data on Modbus device

<device><u>\\.\COM12</device</u>>

--- RTU device COM port <baud>115200</baud> --- RTU device baud rate <parity>N</parity> --- RTU device parity (N, E, O) <dataBit>8</dataBit> --- RTU device data bit (5,6,7,8) <stopBit>1</stopBit> --- RTU device stop bit (1,2)

[Response]

<?xml version="1.0" encoding="UTF-8"?>

<readInputRegisters>

<startAddress>10000</startAddress>

 $<\!\!length\!\!>\!\!7\!<\!\!/length\!\!>$

<values>2560,60671,7680,-30,50,10,1376286</values>

<rawdata>00000A00,0000ECFF,00001E00,FFFFFFE2,00000032,0000000A,0015001E</rawdata>

</readInputRegisters>

5.1.5 Force Single Coil

[URI] http://hostname:port/fc5

[Request] TCP connection

Software User Manual for DEX-100 V1.0

44/55



<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>TCP</connectionType>
<ip>127.0.0.1</ip>
<port>502</port>
<slave>1</slave>
<dataType>UINT8</dataType>
<startAddress>0</startAddress>
<value>1</value>
</ModbusService>

RTU connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>RTU</connectionType>

<device>\\.\COM12</device>

<baud>115200</baud>

<parity>N</parity>

<dataBit>8</dataBit>

<stopBit>1</stopBit>

<slave>1</slave>

<dataType>UINT8</dataType>

 $<\!\!startAddress\!\!>\!\!0\!<\!\!/startAddress\!\!>$

<value>1</value>

</ModbusService>

[Explanation]

<connectionType>TCP</connectionType> --- Modbus connection type, it may be TCP and RTU <ip>127.0.0.1</ip> --- TCP device IP <port>502</port> --- TCP device Port <slave>1</slave> --- Modbus Slave ID <dataType>INT32</dataType> --- Data type, fc5 only has UINT8 <startAddress>0</startAddress>

Software User Manual for DEX-100 V1.0

45/55



--- Start Address on Modbus device

<value>1</value>

--- Write bit value to Modbus device, it may be 1, true , True, TRUE, 0, false, False and FALSE

<device>\\.\COM12</device>
--- RTU device COM port
<baud>115200</baud>
--- RTU device baud rate
<parity>N</parity>
--- RTU device parity (N, E, O)
<dataBit>8</dataBit>
--- RTU device data bit (5,6,7,8)
<stopBit>1</stopBit>
--- RTU device stop bit (1,2)

[Response]

<?xml version="1.0" encoding="UTF-8"?>

<writeBit>

<startAddress>0</startAddress>

<values>1</values>

<response>Success</response>

</writeBit>

5.1.6 Preset Single Register

[URI] http://hostname:port/fc6

[Request] TCP connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>TCP</connectionType>

<ip>127.0.0.1</ip>

<port>502</port>

<slave>1</slave>

<dataType>INT16</dataType>

 $<\!\!dataSwapType\!\!>\!\!ORIGINAL<\!\!/dataSwapType\!\!>$

<startAddress>0</startAddress>

<value>-20</value>

Software User Manual for DEX-100 V1.0

46/55





<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>RTU</connectionType>

<device>\\.\COM12</device>

<baud>115200</baud>

<parity>N</parity>

<dataBit>8</dataBit>

<stopBit>1</stopBit>

<slave>1</slave>

<dataType>INT16</dataType>

<dataSwapType>ORIGINAL</dataSwapType>

<startAddress>0</startAddress>

<value>-20</value>

</ModbusService>

[Explanation]

<connectionType>TCP</connectionType> --- Modbus connection type, it may be TCP and RTU <ip>127.0.0.1</ip> --- TCP device IP <port>502</port> --- TCP device Port <slave>1</slave> --- Modbus Slave ID <dataType>INT16</dataType> --- Data type, fc6 only has UINT16 and INT16 <dataSwapType>ORIGINAL</dataSwapType> --- Data swap type, fc6 only has ORIGINAL and SWAP_BYTE <startAddress>0</startAddress> --- Start Address on Modbus device <value>-20</value> --- Write register value to Modbus device

<device>\\.\COM12</device> --- RTU device COM port <baud>115200</baud> --- RTU device baud rate <parity>N</parity> --- RTU device parity (N, E, O)

Software User Manual for DEX-100 V1.0







<*dataBit>8*</*dataBit>* --- RTU device data bit (5,6,7,8) <*stopBit>1*</*stopBit>* --- RTU device stop bit (1,2)

[Response]

<?xml version="1.0" encoding="UTF-8"?>

<writeRegister>

 $<\!\!startAddress\!\!>\!\!0\!<\!\!/startAddress\!\!>$

<values>-20</values>

<response>Success</response>

</writeRegister>

5.1.7 Force Multiple Coils

[URI] http://hostname:port/fc15

[Request] TCP connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>TCP</connectionType>

 $<\!\!ip\!\!>\!\!127.0.0.1<\!\!/ip\!\!>$

 $<\!\!port\!>\!\!502<\!\!/port\!>$

<slave>4</slave>

<dataType>UINT8</dataType>

<startAddress>0</startAddress>

<length>4</length>

<values>0,1,0,1</values>

</ModbusService>

RTU connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>RTU</connectionType>

<device>\\.\COM12</device>

Software User Manual for DEX-100 V1.0

48/55



<baud>115200</baud>

<parity>N</parity>

<dataBit>8</dataBit>

<stopBit>1</stopBit>

<slave>4</slave>

<dataType>UINT8</dataType>

<startAddress>0</startAddress>

<length>4</length>

<values>0,1,0,1</values>

</ModbusService>

[Explanation]

<connectionType>TCP</connectionType> --- Modbus connection type, it may be TCP and RTU <*ip*>127.0.0.1</*ip*> --- TCP device IP <port>502</port> --- TCP device Port <slave>4</slave> --- Modbus Slave ID <dataType>UINT8</dataType> --- Data type, fc15 only has UINT8 <startAddress>0</startAddress> --- Start Address on Modbus device <length>4</length> --- no. of bit value <*value*>0,1,0,1</*value*> --- Write bits value to Modbus device, it may be 1, true, True, TRUE, 0, false, False and FALSE

<device>\\.\COM12</device>
--- RTU device COM port
<baud>115200</baud>
--- RTU device baud rate
<parity>N</parity>
--- RTU device parity (N, E, O)
<dataBit>8</dataBit>
--- RTU device data bit (5,6,7,8)
<stopBit>1</stopBit>
--- RTU device stop bit (1,2)

[Response]

<?xml version="1.0" encoding="UTF-8"?>

Software User Manual for DEX-100 V1.0

49/55



<writeBits>

 $<\!\!\! startAddress \!\!>\!\! 0 \!\!<\!\!/ startAddress \!\!>\!\!$

<length>4</length>

<values>0,1,0,1</values>

<response>Success</response>

</writeBits>

5.1.8 Force Multiple Coils

[URI] http://hostname:port/fc16

[Request] TCP connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>TCP</connectionType>

 $<\!\!ip\!\!>\!\!127.0.0.1<\!\!/ip\!\!>$

<port>502</port>

<slave>1</slave>

<dataType>FLOAT32</dataType>

<dataSwapType>SWAP_BYTE_WORD</dataSwapType>

 $<\!\!startAddress\!\!>\!\!0\!<\!\!/startAddress\!\!>$

<length>3</length>

<values>10,20,10.1</values>

</ModbusService>

RTU connection

<?xml version="1.0" encoding="UTF-8"?>

<ModbusService>

<connectionType>RTU</connectionType>

<device>\\.\COM12</device>

<baud>115200</baud>

<parity>N</parity>

<dataBit>8</dataBit>

<stopBit>1</stopBit>

Software User Manual for DEX-100 V1.0

50/55



<slave>1</slave>

<dataType>FLOAT32</dataType>

<dataSwapType>SWAP_BYTE_WORD</dataSwapType>

<startAddress>0</startAddress>

<length>3</length>

<values>10,20,10.1</values>

</ModbusService>

[Explanation]

<connectionType>TCP</connectionType> --- Modbus connection type, it may be TCP and RTU <ip>127.0.0.1</ip> --- TCP device IP <port>502</port> --- TCP device Port <slave>4</slave> --- Modbus Slave ID <dataType>FLOAT32</dataType> --- Data type, fc16 only has UINT16, UINT32, INT16, INT32 and FLOAT32 <dataSwapType>SWAP_BYTE</dataSwapType> --- Data swap type, fc16 For the data type UINT16 and INT16 are ORIGINAL and SWAP_BYTE For the data type UINT32, INT32 and FLOAT32 are ORIGINAL, SWAP_BYTE, SWAP_WORD and SWAP_BYTE_WORD <startAddress>0</startAddress> --- Start Address on Modbus device <length>3</length> --- no. of register value <value>10,20,10.1</value> --- Write registers value to Modbus device

<device>\\.\COM12</device>
--- RTU device COM port
<baud>115200</baud>
--- RTU device baud rate
<parity>N</parity>
--- RTU device parity (N, E, O)
<dataBit>8</dataBit>
--- RTU device data bit (5,6,7,8)
<stopBit>1</stopBit>
--- RTU device stop bit (1,2)

[Response]

<?xml version="1.0" encoding="UTF-8"?>

Software User Manual for DEX-100 V1.0

51/55



<writeRegisters>

 $<\!\!startAddress\!\!>\!\!0\!<\!\!/startAddress\!\!>$

<length>3</length>

 $<\!\!values\!\!>\!\!10,\!20,\!10.1<\!\!/values\!\!>$

<response>Success</response>

</writeRegisters>

5.2 Modbus REST API Error Message Reference

This section describes which situation you will get the error message for the Modbus REST response. TBD

Software User Manual for DEX-100 V1.0

52/55



6. Edge Server

After you start the Vortex OpenSplice, you need to start the edge server program. The edge server program is the first starting program before every DEX-100 DDS module starting because it must subscribe all DEX-100 devices' extraction data and creates table schema automatically.



6.1 Starting Edge Server Program

The starting Edge Server Program step by step is as follows:

- 1. Open the terminal
- 2. Check your Vortex OpenSplice already started "ospl start"

dexserver@dexserver-MXE5500:~\$ ospl start
Domain with name ospl_shmem_ddsi with id 0 is already running, ignoring command

 If Vortex OpenSplice already started, change path to /usr/local/ADLINK "cd /usr/local/ADLINK"

dexserver@dexserver-MXE5500:~\$ cd /usr/local/ADLINK

 Start program ./edgeserver_sub, then the program will subscribe the DDS data if have any data publishing

```
dexserver@dexserver-MXE5500:/usr/local/ADLINK$ ./edgeserver_sub
Edge Server Service start...
Set default configuration
Pool started with 16 threads and queue size of 64
Waiting for writer...
```

6.2 Database

Software User Manual for DEX-100 V1.0

53/55



How to check the machine data in the database?

1. Open the MySQL workbench to see the data for all DEX-100



2. One DEX-100 will allocate 4 tables: LightColor_% machineid %, WarningMsg_%machineid, AlarmMsg_%machineid%, MachineStatus_%machineid%

Software User Manual for DEX-100 V1.0

54/55



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Software User Manual for DEX-100 V1.0

55/55