The application of Simatic Wincc in the engine table

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Abstract: Engine test bench is required to test and file the key performance parameters of the engine, so as to analyze whether the performance of the engine is up to the standard.This paper introduces the main application of WinCC in the engine table. Through the SIEMENS PC monitoring software WinCC integrated VBS scripting function, store the real-time acquisition of engine data in the SQL database. In accordance with the engine code and other keywords query engine's historical data, the results of the query will be outputted in the form of Excel file, to achieve a strong function of the data report.
Keywords: SIMATIC WinCC;engine table;VBS script;SQL database

I.   INTRODUCTION OF SIMATIC WINCC

SIMATIC Wincc which is Windows control center,is the SIEMENS TIA architecture based on HIM/SCADA PC software system.

TIA is Totally Integrated Automation,HIM is Human Machine Interface and SCADA is Supervisory Control And Data Acquisition. SCADA system is a computer based production process control and scheduling automation system.It can monitor and control the running equipment of the field in order to realize the function of data acquisition, equipment control,measurement,parameter adjustment and all kinds of signal alarm.The data is stored in the database,which can realize the historical archives and data query or print the output in the form of Excel report forms.The component of Wincc system is showed in fig.1.
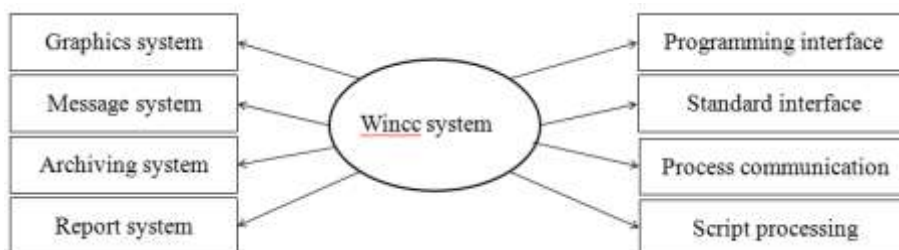

Fig.1 component of Wincc system

II.   COMPONENT OF TEST AND CONTROL SYSTEM OF ENGINE TABLE

The test and control system of engine table is composed of hardware and software.There are four parts of components of hardware: 1) A variety of sensors installed on the engine.2)SIEMENS RFID(Radio Frequency Identification),it can transmit the engine information to the main controller.3)SIEMENS S7300 series programmable controller.4)SIEMENS SCALANCE200 series switch.

The software of engine bench test and control system is mainly composed of the upper computer software WinCC SIMATIC and the server software.

III.   INTRODUCTION OF THE WORKING PROCESS OF THE ENGINE TEST AND CONTROL SYSTEM

First of all,engine information like engine type,engine identification number will be read by SIEMENS RFID installed on engine class and transferred to PLC,then they will be sent to the host computer through industrial Ethernet, displayed on the touch screen.After the engine test bench is ready, the parameters of the engine are tested. In the test process, the PLC reads these parameters like oil temperature, oil pressure, fuel pressure,

water temperature, etc.These values are sent to the host computer for display monitoring.Finally, WINCC software will save the data to the database,to realize data query and analysis, or print output in the form of Excel statements.The processing is shown as fig.2.
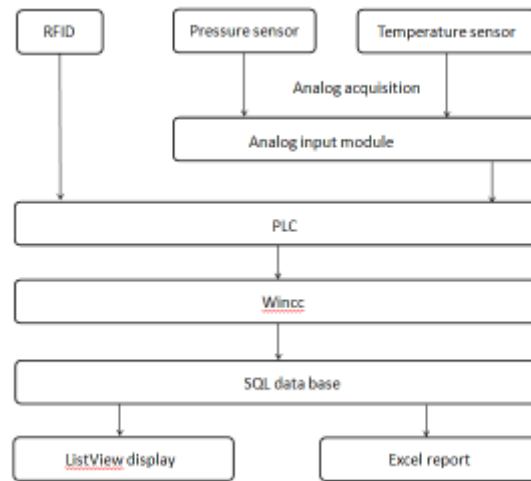

Fig.2   work follow chart

IV.   ACCESS DATA BASE

WinCC is an excellent host configuration software for monitoring and controlling and data acquisition. One of its advantages is the openness of WinCC data.WinCC uses the standard SQL Server MS database as the storage database of configuration data and archive data. WinCC integrated runtime scripting language based on Microsoft VB, using the Microsoft standard tool for editing and debugging, attributes and methods of using VBS to access ActiveX controls and other Windows applications.

4.1 Principle of data acquisition and storage

WinCC can communicate with each PLC station site through industrial Ethernet, MPI, DP and other means of communication,collect the data in the form of variable label,and then use its own Script VB editor to prepare the standard SQL statement, stored the real-time information in the database.A lot of ways to access to the database , such as the establishment of ODBC connection, the use of DB ADO/OLE, etc., this paper uses ADO/OLE DB way to access the SQL database.

ADO/OLE DB is an open standard for quick access to different data, which is based on the component object model and the distributed component object model, and can access the relational database and the non relational database.WinCC OLE DB can access all of Wincc's variable archive data directly.

The connection with the database using ADO/OLE DB to establish, where the most important parameter is the connection string.The connection string contains all the information that is required to access the database,which structure is Provider=WinCC OLE DB Provider. 1；Catalog=Database Name；Data Source=Server Name.

4.2 VBS script to achieve data acquisition and storage

Open SQL Server Management Studio manager,create a data base named "excel_report".According to the process requirements, create a database table with the following field T1.According to the number of engine bench test sets, a number of data tables with the following fields can be created.dbo.T1 data table field is:
dbo.T1

Test table number(varchar (50)，not null)
Engine code(varchar (50)，not null)
Engine model(varchar (50)，not null)
Speed(int，null)
OILT Engine-oil-Temperature(float，null)

Oil pressure(float，null)
Fuel pressure(float，null)
Outlet temperature(float，null)
Exhaust temperature(float，null)
Intake vacuum(float，null)
CO (float，null)
11C (float，null)
Idling(int，null)
Tray number(int，null)
Operator number(varchar (50)，null)
Whether qualified(varchar (50)，null)
Data creation time(datetime，null)

The following script is implemented to read the data from the Wincc variable manager, using the VBS script using ADO/OLE DB way to store data into the SQL database T1 table.
Defined variables:
Dim objConnection，objCommand，objRecordset，strConnectionString，strSQL
Dim sPro,SDNS,sSer,sCon
Spell ADO string format:
sPro = "Provider=SQLOLEDB. 1；
sDNS = "Catalog = excel_ report；
sSer="Data Source=.\WINCC
sCon=sPro+sDNS+sSer
Stored data is in the database through the SQL statement:
strSQL="INSERT INTO T1 VALUES('"&CStr(Test table number.value) & '"，'"&CStr(Engine model.value) & '"，'" CStr(Engine code.value) &'"，'"&Idling.valuE&'"
Create a database connection and execute the strSQL statement:
Set objConnection=CreateObject ("ADODB. Connection")
objConnection. ConnectionString=strConneetionString
objConnection. Open"Open database
SetobjRe cordset = CreateObject ("ADODB. Recordset")
SetobjCo mmand = CreateObject ("ADODB. Command")
With objcommand
ActiveConnection =objConnection
Command'text = strSQL"Command to data source
End With
objcommand.Execurte"Issue commands to data source via Connection object

V. CONCLUSIONS

Wincc can significantly improve the level of automation, measurement and control accuracy of the engine bench test, which is conducive to improve the level of engine development and manufacturing.The test and test personnel can monitor the running status of the test bench in real time, according to the needs of different control.WinCC's general purpose applications, suitable for all areas of industrial solutions, it supports multiple language and can integrated into all automation solutions. All of the built-in operations and management functions can be simple, effective configuration.It's application in the engine table has been highly evaluated by the user.

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