SmartGen

MAKING CONTROL SMARTER

ACC7200

DIESEL AIR COMPRESSOR CONTROLLER

COMMUNICATION PROTOCOL

郑州众智科技股份有限公司
SMARTGEN(ZHENGZHOU)TECHNOLOGY CO.,LTD.

SmartGen众智 **Chinese trademark**

SmartGen **English trademark**

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Table 1 Version History

Date	Version	Content
2022-08-04	V1.0	Original release.

CONTENTS

1 DESCRIPTION

This protocol describes read and write command format of RS485 half-duplex serial port communication and definition of internal information data for the third-party to develop and use.

The controller is used as a slave, using Modbus-RTU protocol, and does not support other protocols such as Modbus-ASCII.

Communication address: 1~254 (default: 1)
Baud rate: 9600bps
Start bit: 1-bit
Data bit: 8-bit
Parity bit: No parity
Stop bit: 1-bit

Supported function code: 03H, 05H. Function code 03H is used for reading controller alarm, status information and various sensor data; while function code 05H is used for sending remote command.

Data check mode: CRC16.

Internal registers of controller are in the unit of “word (double bytes)”.

Communication timeout period: over 200ms.

Communication distance: 9600 baud rate, the longest distance can reach 1,000m when using 120Ω shielding twisted pair.

Once maximum 120 data of word register can be read.

Up to 32 controllers can be connected together for network communication.

When RS485 is connected, 120Ω twisted pair with shielding layer shall be used, and the shielding layer shall be grounded at one end.

2 WIRING DIAGRAM

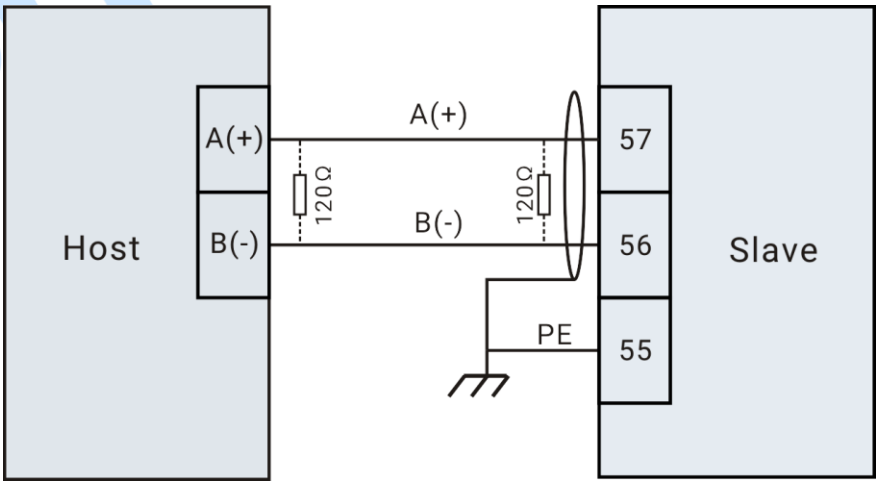

Fig.1 Single Unit Communication Wiring Diagram

NOTE1: 2 120Ω impedance resistors can be connected automatically according to site situation, details refer to the following description.

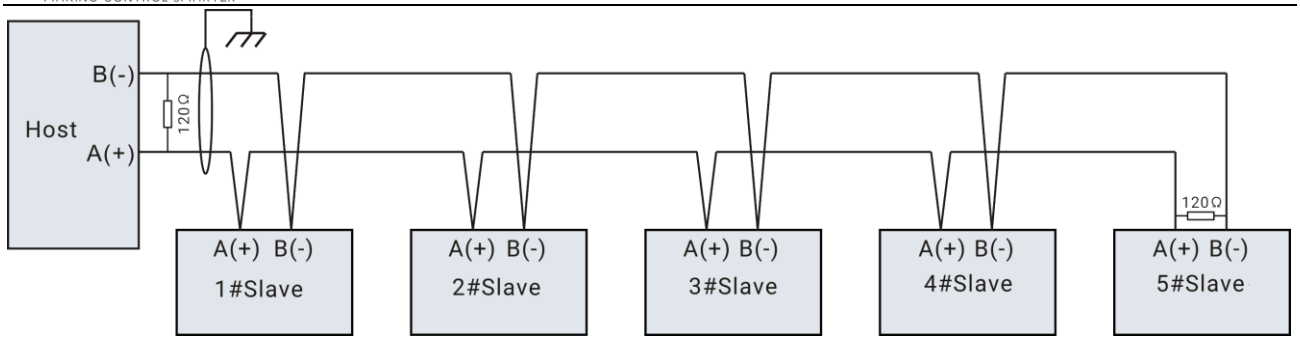

Fig.2 Multi-unit Communication Wiring Diagram

NOTE1: Please set each controller's communication module address before networking. Same module address is inhibited in the same network.

NOTE2: The shielding layer of communication line is single-end grounded on the host side.

3 CONTROLLER INTERNAL REGISTER ADDRESS AND DATA

3.1 ALARM, STATUS COIL DATA FIELD CORRESPONDING TO FUNCTION CODE 03H

Table 2 Alarm, Status Coil Data Field

Address	Item	Description	Bytes
0000	Common Alarm	1 for active (LSB)	1bit
	Common Shutdown Alarm	1 for active	1bit
	Common Warning Alarm	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Auto Mode	1 for active	1bit
	Manual Mode	1 for active	1bit
	Stop Mode	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Lock Mode	1 for active (MSB)	1bit
0001	Emergency Stop Alarm	1 for active	1bit
	Engine Overspeed Alarm	1 for active	1bit
	Reserved	1 for active	1bit
	Speed Signal Loss Alarm	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit

Address	Item	Description	Bytes
	Crank Failure Alarm	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	ECU Alarm Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Low Urea Level Alarm Shutdown	1 for active	1bit
	High Temperature Input Alarm Shutdown	1 for active	1bit
	Low Oil Pressure Input Alarm Shutdown	1 for active	1bit
0002	ECU Comm. Failure Alarm Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Engine Temperature Open Shutdown	1 for active	1bit
	Engine High Temperature Shutdown	1 for active	1bit
	Engine Low Temperature Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Engine Oil Pressure Open Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Engine Low Oil Pressure Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
0003	Sensor 1 Open Alarm Shutdown	1 for active	1bit
	Sensor 1 High Alarm Shutdown	1 for active	1bit
	Sensor 1 Low Alarm Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 2 Open Alarm Shutdown	1 for active	1bit
	Sensor 2 High Alarm Shutdown	1 for active	1bit
	Sensor 2 Low Alarm Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 3 Open Alarm Shutdown	1 for active	1bit
	Sensor 3 High Alarm Shutdown	1 for active	1bit
	Sensor 3 Low Alarm Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 4 Open Alarm Shutdown	1 for active	1bit
	Sensor 4 High Alarm Shutdown	1 for active	1bit
	Sensor 4 Low Alarm Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
0004	Sensor 5 Open Alarm Shutdown	1 for active	1bit
	Sensor 5 High Alarm Shutdown	1 for active	1bit

Address	Item	Description	Bytes
	Sensor 5 Low Alarm Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 6 Open Alarm Shutdown	1 for active	1bit
	Sensor 6 High Alarm Shutdown	1 for active	1bit
	Sensor 6 Low Alarm Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 7 Open Alarm Shutdown	1 for active	1bit
	Sensor 7 High Alarm Shutdown	1 for active	1bit
	Sensor 7 Low Alarm Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 8 Open Alarm Shutdown	1 for active	1bit
	Sensor 8 High Alarm Shutdown	1 for active	1bit
	Sensor 8 Low Alarm Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
0005	Input 1 Shutdown	1 for active	1bit
	Input 2 Shutdown	1 for active	1bit
	Input 3 Shutdown	1 for active	1bit
	Input 4 Shutdown	1 for active	1bit
	Input 5 Shutdown	1 for active	1bit
	Input 6 Shutdown	1 for active	1bit
	Input 7 Shutdown	1 for active	1bit
	Input 8 Shutdown	1 for active	1bit
	Input 9 Shutdown	1 for active	1bit
	Input 10 Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Authorization Time Due Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0006	Oil Filter Time Due Shutdown	1 for active	1bit
	Oil Separator Time Due Shutdown	1 for active	1bit
	Air Filter Time Due Shutdown	1 for active	1bit
	Lubricating Oil Time Due Shutdown	1 for active	1bit
	Engine Oil Filter Time Due Shutdown	1 for active	1bit
	Engine Fuel Filter Time Due Shutdown	1 for active	1bit
	Engine Lubricating Oil Time Due Shutdown	1 for active	1bit
	Maintenance 8 Time Due Shutdown	1 for active	1bit
	Maintenance 9 Time Due Shutdown	1 for active	1bit
	Maintenance 10 Time Due Shutdown	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit

Address	Item	Description	Bytes
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0007	Reserved	2Bytes	2Bytes
0008	Reserved	2Bytes	2Bytes
0009	Reserved	2Bytes	2Bytes
0010	Reserved	2Bytes	2Bytes
0011	Reserved	2Bytes	2Bytes
0012	Reserved	2Bytes	2Bytes
0013	Reserved	2Bytes	2Bytes
0014	Reserved	2Bytes	2Bytes
0015	Reserved	2Bytes	2Bytes
0016	Reserved	2Bytes	2Bytes
0017	Reserved	2Bytes	2Bytes
0018	Reserved	2Bytes	2Bytes
0019	Reserved	2Bytes	2Bytes
0020	Engine Overspeed Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Speed Signal Loss Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Stop Failure Warning	1 for active	1bit
	Charge Failure Warning	1 for active	1bit
	Battery Overvoltage Warning	1 for active	1bit
	Battery Undervoltage Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Low Urea Level Warning	1 for active	1bit
	ECU Warning	1 for active	1bit
0021	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Engine Temperature Open Warning	1 for active	1bit

Address	Item	Description	Bytes
	Engine High Temperature Warning	1 for active	1bit
	Engine Low Temperature Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Engine Oil Pressure Open Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Engine Low Oil Pressure Warning	1 for active	1bit
	Reserved	1 for active	1bit
0022	Sensor 1 Open Warning	1 for active	1bit
	Sensor 1 High Warning	1 for active	1bit
	Sensor 1 Low Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 2 Open Warning	1 for active	1bit
	Sensor 2 High Warning	1 for active	1bit
	Sensor 2 Low Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 3 Open Warning	1 for active	1bit
	Sensor 3 High Warning	1 for active	1bit
	Sensor 3 Low Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 4 Open Warning	1 for active	1bit
	Sensor 4 High Warning	1 for active	1bit
	Sensor 4 Low Warning	1 for active	1bit
	Reserved	1 for active	1bit
0023	Sensor 5 Open Warning	1 for active	1bit
	Sensor 5 High Warning	1 for active	1bit
	Sensor 5 Low Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 6 Open Warning	1 for active	1bit
	Sensor 6 High Warning	1 for active	1bit
	Sensor 6 Low Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 7 Open Warning	1 for active	1bit
	Sensor 7 High Warning	1 for active	1bit
	Sensor 7 Low Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Sensor 8 Open Warning	1 for active	1bit
	Sensor 8 High Warning	1 for active	1bit
	Sensor 8 Low Warning	1 for active	1bit
	Reserved	1 for active	1bit
0024	Input 1 Warning	1 for active	1bit
	Input 2 Warning	1 for active	1bit
	Input 3 Warning	1 for active	1bit

Address	Item	Description	Bytes
	Input 4 Warning	1 for active	1bit
	Input 5 Warning	1 for active	1bit
	Input 6 Warning	1 for active	1bit
	Input 7 Warning	1 for active	1bit
	Input 8 Warning	1 for active	1bit
	Input 9 Warning	1 for active	1bit
	Input 10 Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Authorization Time Due Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0025	Oil Filter Time Due Warning	1 for active	1bit
	Oil Separator Time Due Warning	1 for active	1bit
	Air Filter Time Due Warning	1 for active	1bit
	Lubricating Oil Time Due Warning	1 for active	1bit
	Engine Oil Filter Time Due Warning	1 for active	1bit
	Engine Fuel Filter Time Due Warning	1 for active	1bit
	Engine Lubricating Oil Time Due Warning	1 for active	1bit
	Maintenance 8 Time Due Warning	1 for active	1bit
	Maintenance 9 Time Due Warning	1 for active	1bit
	Maintenance 10 Time Due Warning	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0026	Reserved	2Bytes	2Bytes
0027	Reserved	2Bytes	2Bytes
0028	Reserved	2Bytes	2Bytes
0029	Reserved	2Bytes	2Bytes
0030	Reserved	2Bytes	2Bytes
0031	Reserved	2Bytes	2Bytes
0032	Reserved	2Bytes	2Bytes
0033	Input 1 Indication	1 for active	1bit
	Input 2 Indication	1 for active	1bit
	Input 3 Indication	1 for active	1bit
	Input 4 Indication	1 for active	1bit
	Input 5 Indication	1 for active	1bit
	Input 6 Indication	1 for active	1bit

Address	Item	Description	Bytes
	Input 7 Indication	1 for active	1bit
	Input 8 Indication	1 for active	1bit
	Input 9 Indication	1 for active	1bit
	Input 10 Indication	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0034	Oil Filter Time Due Indication	1 for active	1bit
	Oil Separator Time Due Indication	1 for active	1bit
	Air Filter Time Due Indication	1 for active	1bit
	Lubricating Oil Time Due Indication	1 for active	1bit
	Engine Oil Filter Time Due Indication	1 for active	1bit
	Engine Fuel Filter Time Due Indication	1 for active	1bit
	Engine Lubricating Oil Time Due Indication	1 for active	1bit
	Maintenance 8 Time Due Indication	1 for active	1bit
	Maintenance 9 Time Due Indication	1 for active	1bit
	Maintenance 10 Time Due Indication	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0035	Emergency Input Port Status	1 for active	1bit
	Input 1 Status	1 for active	1bit
	Input 2 Status	1 for active	1bit
	Input 3 Status	1 for active	1bit
	Input 4 Status	1 for active	1bit
	Input 5 Status	1 for active	1bit
	Input 6 Status	1 for active	1bit
	Input 7 Status	1 for active	1bit
	Input 8 Status	1 for active	1bit
	Input 9 Status	1 for active	1bit
	Input 10 Status	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit

Address	Item	Description	Bytes
0036	Reserved	2Bytes	2Bytes
0037	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Aux. Output 1 Status	1 for active	1bit
	Aux. Output 2 Status	1 for active	1bit
	Aux. Output 3 Status	1 for active	1bit
	Aux. Output 4 Status	1 for active	1bit
	Aux. Output 5 Status	1 for active	1bit
	Aux. Output 6 Status	1 for active	1bit
	Aux. Output 7 Status	1 for active	1bit
	Aux. Output 8 Status	1 for active	1bit
	Aux. Output 9 Status	1 for active	1bit
	Aux. Output 10 Status	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0038	Reserved	2Bytes	2Bytes
0039	Reserved	2Bytes	2Bytes
0040	Reserved	2Bytes	2Bytes
0041	Load Valve Auto Control Output	1 for active	1bit
	Load Status Output	1 for active	1bit
	Overload Protect Status	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Auto Drain Output	1 for active	1bit
	Idle Running Status	1 for active	1bit
	Inhibit Alarm Shutdown	1 for active	1bit
	Instrument Mode Status	1 for active	1bit
	Remote Start Status	1 for active	1bit
	Reserved	1 for active	1bit
	Inhibit Auto Start	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0042	Alt. Config. 1 Active	1 for active	1bit
	Alt. Config. 2 Active	1 for active	1bit
	Alt. Config. 3 Active	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit

Address	Item	Description	Bytes
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0043	Maintenance Pre-alarm Lamp	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Running Status Lamp	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0044	DPF Fault	1 for active	1bit
	DPF Request	1 for active	1bit
	DPF Inhibit Lamp	1 for active	1bit
	DPF Exhaust Temp. Lamp	1 for active	1bit
	DPF Ack. Lamp	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit

Address	Item	Description	Bytes
0045	Input 1 Active	1 for active	1bit
	Input 2 Active	1 for active	1bit
	Input 3 Active	1 for active	1bit
	Input 4 Active	1 for active	1bit
	Input 5 Active	1 for active	1bit
	Input 6 Active	1 for active	1bit
	Input 7 Active	1 for active	1bit
	Input 8 Active	1 for active	1bit
	Input 9 Active	1 for active	1bit
	Input 10 Active	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
	Reserved	1 for active	1bit
0046	Reserved	2Bytes	2Bytes
0047	Reserved	2Bytes	2Bytes
0048	Reserved	2Bytes	2Bytes
0049	Reserved	2Bytes	2Bytes
0050	Engine Speed	Unsigned	2Bytes
0051	Battery Voltage	Signed (*10)	2Bytes
0052	Charger Voltage	Signed (*10)	2Bytes
0053	Engine Temp. Resist. (Current/Voltage Value)	Unsigned (*10)	2Bytes
0054	Engine Temp. Value (Water Temp. ECU)	Signed	2Bytes
0055	Engine OP Resist. (Current/Voltage Value)	Unsigned (*10)	2Bytes
0056	Engine OP Value (Oil Pressure ECU)	Signed	2Bytes
0057	Sensor 1 Resistance	Unsigned (*10)	2Bytes
0058	Sensor 1 Value (Aux. 1)	Signed	2Bytes
0059	Sensor 2 Resistance	Unsigned (*10)	2Bytes
0060	Sensor 2 Value (Aux. 2)	Signed	2Bytes
0061	Sensor 3 Resistance	Unsigned (*10)	2Bytes
0062	Sensor 3 Value (Aux.3)	Signed	2Bytes
0063	Sensor 4 Resistance /Current/Voltage	Unsigned (*10)	2Bytes
0064	Sensor 4 Value (Aux.4)	Signed	2Bytes
0065	Sensor 5 Resistance /Current/Voltage	Unsigned (*10)	2Bytes
0066	Sensor 5 Value (Aux.5)	Signed	2Bytes
0067	Sensor 6 Resistance /Current/Voltage	Unsigned (*10)	2Bytes
0068	Sensor 6 Value (Aux.6)	Signed	2Bytes
0069	Sensor 7 Resistance /Current/Voltage	Unsigned (*10)	2Bytes
0070	Sensor 7 Value (Aux.7)	Signed	2Bytes
0071	Sensor 8 Resistance /Current/Voltage	Unsigned (*10)	2Bytes

Address	Item	Description	Bytes
0072	Sensor 8 Value (Aux.8)	Signed	2Bytes
0073	Reserved	Unsigned (*10)	2Bytes
0074	Reserved	Signed	2Bytes
0075	Reserved	Unsigned (*10)	2Bytes
0076	Reserved	Signed	2Bytes
0077	Coolant Pressure	Signed	2Bytes
0078	Coolant Level	Signed	2Bytes
0079	Fuel Pressure	Signed	2Bytes
0080	Fuel Temperature	Signed	2Bytes
0081	Oil Temperature	Signed	2Bytes
0082	Inlet Temperature	Signed	2Bytes
0083	Turbo Pressure	Signed	2Bytes
0084	Exhaust Temperature	Signed	2Bytes
0085	Fuel Consumption	Signed	2Bytes
0086	Accumulated Fuel Consumption (LSB)	Signed	4Bytes
0087	Accumulated Fuel Consumption (MSB)		
0088	Reserved	Signed	2Bytes
0089	Reserved	Signed	2Bytes
0090	Engine Load Rate	Signed	2Bytes
0091	Torque Percentage	Signed	2Bytes
0092	Water in Fuel	Signed	2Bytes
0093	Urea Level	Signed	2Bytes
0094	Engine Status	Controller Running Status	2Bytes
0095	Engine Delay Value	Unsigned	2Bytes
0096	Reserved	Unsigned	2Bytes
0097	Reserved	Unsigned	2Bytes
0098	Reserved	Unsigned	2Bytes
0099	Reserved	Unsigned	2Bytes
0100	Reserved	Unsigned	2Bytes
0101	Accumulated Running Hours	Unsigned	2Bytes
0102	Accumulated Running Minutes	Unsigned	2Bytes
0103	Accumulated Running Seconds	Unsigned	2Bytes
0104	Accumulated Start Times	Unsigned	2Bytes
0105	Current Running Hours	Unsigned	2Bytes
0106	Current Running Minutes	Unsigned	2Bytes
0107	Current Running Seconds	Unsigned	2Bytes
0108	Reserved	Unsigned	2Bytes
0109	Reserved	Unsigned	2Bytes
0110	Reserved	Unsigned	2Bytes
0111	Reserved	Unsigned	2Bytes
0112	Reserved	Unsigned	2Bytes

Address	Item	Description	Bytes
0113	Controller Model	Unsigned	2Bytes
0114	Controller Software Version	Unsigned (*10)	2Bytes
0115	Controller Hardware Version	Unsigned (*10)	2Bytes
0116	Release Year	Only save last 2 digits of year	2Bytes
0117	Release Month	Unsigned	2Bytes
0118	Release Day	Unsigned	2Bytes
0119	Reserved		2Bytes
0120	Event Log Pieces	Unsigned	2Bytes
0121	Controller Time: Year	Only save last 2 digits of year	2Bytes
0122	Controller Time: Month	Unsigned	2Bytes
0123	Controller Time: Day	Unsigned	2Bytes
0124	Controller Time: Week	Unsigned	2Bytes
0125	Controller Time: Hour	Unsigned	2Bytes
0126	Controller Time: Minute	Unsigned	2Bytes
0127	Controller Time: Second	Unsigned	2Bytes
0128	Reserved	Unsigned	2Bytes
0129	Reserved	Unsigned	2Bytes
0130	Reserved	Unsigned	2Bytes
0131	Reserved	Unsigned	2Bytes
0132	Reserved	Unsigned	2Bytes
0133	Reserved	Unsigned	2Bytes
0134	Reserved	Unsigned	2Bytes
0135	Oil Filter Maintenance Left Time: Hour	Unsigned	2Bytes
0136	Oil Filter Maintenance Left Time: Minute	Unsigned	2Bytes
0137	Oil Filter Maintenance Left Time: Second	Unsigned	2Bytes
0138	Oil Separator Maintenance Left Time: Hour	Unsigned	2Bytes
0139	Oil Separator Maintenance Left Time: Minute	Unsigned	2Bytes
0140	Oil Separator Maintenance Left Time: Second	Unsigned	2Bytes
0141	Air Filter Maintenance Left Time: Hour	Unsigned	2Bytes
0142	Air Filter Maintenance Left Time: Minute	Unsigned	2Bytes
0143	Air Filter Maintenance Left Time: Second	Unsigned	2Bytes
0144	Lubricating Oil Maintenance Left Time: Hour	Unsigned	2Bytes
0145	Lubricating Oil Maintenance Left Time: Minute	Unsigned	2Bytes
0146	Lubricating Oil Maintenance Left Time: Second	Unsigned	2Bytes
0147	Engine Oil Filter Maintenance Left Time: Hour	Unsigned	2Bytes
0148	Engine Oil Filter Maintenance Left Time: Minute	Unsigned	2Bytes
0149	Engine Oil Filter Maintenance Left Time: Second	Unsigned	2Bytes
0150	Engine Fuel Filter Maintenance Left Time: Hour	Unsigned	2Bytes
0151	Engine Fuel Filter Maintenance Left Time: Minute	Unsigned	2Bytes
0152	Engine Fuel Filter Maintenance Left Time: Second	Unsigned	2Bytes

Address	Item	Description	Bytes
0153	Engine Lubricating Oil Maintenance Left Time: Hour	Unsigned	2Bytes
0154	Engine Lubricating Oil Maintenance Left Time: Minute	Unsigned	2Bytes
0155	Engine Lubricating Oil Maintenance Left Time: Second	Unsigned	2Bytes
0156	Maintenance 8 Left Time: Hour	Unsigned	2Bytes
0157	Maintenance 8 Left Time: Minute	Unsigned	2Bytes
0158	Maintenance 8 Left Time: Second	Unsigned	2Bytes
0159	Maintenance 9 Left Time: Hour	Unsigned	2Bytes
0160	Maintenance 9 Left Time: Minute	Unsigned	2Bytes
0161	Maintenance 9 Left Time: Second	Unsigned	2Bytes
0162	Maintenance 10 Left Time: Hour	Unsigned	2Bytes
0163	Maintenance 10 Left Time: Minute	Unsigned	2Bytes
0164	Maintenance 10 Left Time: Second	Unsigned	2Bytes
0165	Reserved	Unsigned	2Bytes
0166	Reserved	Unsigned	2Bytes
0167	Reserved	Unsigned	2Bytes
0168	Reserved	Unsigned	2Bytes
0169	Reserved	Unsigned	2Bytes
0170	Reserved	Unsigned	2Bytes
0171	Reserved	Unsigned	2Bytes
0172	Reserved	Unsigned	2Bytes
0173	SCM Temperature	Signed	2Bytes
0174	Reserved	Unsigned	2Bytes

Example:

If need to read “Maintenance 10 Left Time”, firstly 3 values need to be read by checking the above table, the corresponding address is 162, 163, 164, then it is known that you need to read 3 addresses’ data.

Assume that the slave (controller) address is 01, master (can be computer) request command is as following:

Table 3 Master (Computer) Request Command

Slave Address	Function Code	Starting Address (162)		Data Qty. (2)		CRC 16 Calibration	
		MSB	LSB	MSB	LSB	LSB	MSB
01	**03**	**00**	**A2**	**00**	**03**	**A4**	**29**

Slave response command is as following:

Table 4 Slave (Controller) Response Command

Slave Address	Function Code	Data Qty. (Bytes)	Data						CRC 16 Calibration	
			(162) MSB	(162) LSB	(163) MSB	(163) LSB	(164) MSB	(164) LSB	LSB	MSB
01	**03**	**06**	**01**	**01**	**00**	**12**	**00**	**10**	**BC**	**AD**

Table 5 Data Analysis

Address	Received Data (Hex)	Convert to Decimal	Data Signification
162	0101H	257	Maintenance 10 left time: 257:18:16.
163	0012H	18	
164	0010H	16	

3.2 REMOTE COIL FIELD CORRESPONDING TO FUNCTION CODE 05H

Table 6 Remote Coil Field

Coil		
Address	Item	Description
0000	Remote Start Key	1 for active
0001	Remote Stop Key	1 for active
0002	Remote Unload Key	1 for active
0003	Remote Load Key	1 for active
0004	Remote Alarm Reset Key	1 for active
0005	Remote Maintenance Key	1 for active
0006	Reserved	1 for active
0007	Remote Up Key	1 for active
0008	Remote Down Key	1 for active
0009	Remote Confirm Key	1 for active
0010	Remote Return Key	1 for active
0011	Select Default Configuration	1 for active
0012	Select Alt. Config. 1	1 for active
0013	Select Alt. Config. 2	1 for active
0014	Select Alt. Config. 3	1 for active
0015	Remote Fast Stop	1 for active
0016	Reserved	1 for active
0017	Reserved	1 for active
0018	Remote Unlock	1 for active
0019	Remote Lock	1 for active
0020	Remote Output 1 Output	1 for active, 0 for inactive
0021	Remote Output 2 Output	1 for active, 0 for inactive
0022	Remote Output 3 Output	1 for active, 0 for inactive
0023	Remote Output 4 Output	1 for active, 0 for inactive
0024	Remote Output 5 Output	1 for active, 0 for inactive
0025	Remote Output 6 Output	1 for active, 0 for inactive
0026	Remote Output 7 Output	1 for active, 0 for inactive
0027	Remote Output 8 Output	1 for active, 0 for inactive
0028	Remote Output 9 Output	1 for active, 0 for inactive
0029	Remote Output 10 Output	1 for active, 0 for inactive
0030	Reset Maintenance 1 Time	1 for active
0031	Reset Maintenance 2 Time	1 for active
0032	Reset Maintenance 3 Time	1 for active
0033	Reset Maintenance 4 Time	1 for active
0034	Reset Maintenance 5 Time	1 for active

Coil		
Address	Item	Description
0035	Reset Maintenance 6 Time	1 for active
0036	Reset Maintenance 7 Time	1 for active
0037	Reset Maintenance 8 Time	1 for active
0038	Reset Maintenance 9 Time	1 for active
0039	Reset Maintenance 10 Time	1 for active

Remote command in the above table can be sent once only.

Example:

Assume that slave address is 01, the master request command is as following:

Table 7 Master Request Command

Slave Address	Function Code	Remote Address (0014)		Remote Data		CRC 16 Calibration	
		MSB	LSB	MSB	LSB	LSB	MSB
01	**05**	**00**	**14**	**FF**	**00**	**CC**	**3E**

Slave response command is as following:

Table 8 Slave Response Command

Slave Address	Function Code	Remote Address (0014)		Remote Data		CRC 16 Calibration	
		MSB	LSB	MSB	LSB	LSB	MSB
01	**05**	**00**	**14**	**FF**	**00**	**CC**	**3E**

Whether the remote command is executed successfully can be confirmed by reading the output status of address 37 via function code 03H.

3.3 CONTROLLER RUNNING STATUS DESCRIPTION

Table 9 Controller Running Status Description

Value (No.)	Name	Delay
0	Standby	No delay value for this status
1	Preheat	
2	Fuel Output	
3	Crank Delay	
4	Crank Rest	
5	Safety Run	
6	Start Idle	
7	High-speed Warming Up	
8	Wait for Load	No delay value for this status
9	Normal Running	No delay value for this status
10	High-speed Cooling	
11	Stop Idle	
12	ETS	
13	Wait for Stop	
14	Stop Failure	No delay value for this status
15	After Stop	

4 FAQ

4.1 COMMUNICATION LINE SHIELDING LAYER GROUNDED

In order to prevent coupled interference signal on communication line, its single end needs to be grounded.

4.2 TERMINAL RESISTOR

At both ends of the linear network (on the two communication ports furthest apart), it is necessary to connect 120Ω terminal resistor in parallel on a pair of communication lines. According to the transmission line theory, the terminal resistor can absorb reflected waves on the network, effectively enhancing the signal strength. The value of two terminal resistors in parallel should be approximately equal to the characteristic impedance of the transmission line at the communication frequency.

A regular RS485 network usually uses terminal resistor. It can also be not used in the case of network connection line is very short, temporary or laboratory test.

4.3 RS485 TO USB COMMUNICATION ADAPTOR

PC can communicate with SG72A module produced by our company.

4.4 EXTENDED COMMUNICATION DISTANCE

Long distance (up to 10km) communication can be realized by a pair of SGCAN300 optical fiber relay modules.

Fig.3 SGCAN300 Application Diagram

4.5 COMMON SOLUTIONS OF COMMUNICATION FAILURE

1) Check whether the positive and negative of RS485 is correctly connected;
2) Check whether the communication parameter setting in parameter setting is correct;
3) Check whether the RS485 converter (if configured) is normal;
4) Check whether the terminal resistor is correctly connected;
5) Disconnect the connection line of controller's RS485, measure the voltage difference of RS485's A and B terminal. If the difference is between +-200mV, it means communication port has abnormal situation;
6) It is recommended to download third-party communication software such as modscan32, modbus poll to check whether communication is normal.