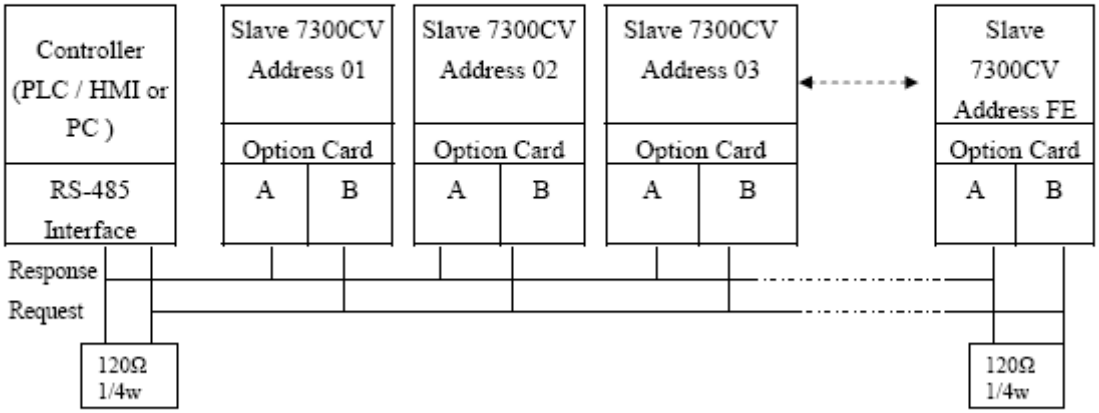
Le câblage :

1. Communication Data Frame

7300CV series inverter can be communication controlled by the PC or other controller with the communication protocol, Modbus ASCII Mode & Mode RTU, RS485 or RS232.

Frame length maximum 80 bytes

1.1 Hardware Installation



It is necessary to connect the terminal impedance (120Ω, 1/4W) at both ends of the communication wire.

Le détail des trames du protocole RTU :

Data frame For RTU Mode

MASTER (PLC etc.) send request to SLAVE, whereas SLAVE response to MASTER. The signal receiving is illustrated here.

The data length is varied with the command (Function).

** The interval should be maintained at 10ms between command signal and request.

SLAVE Address
Function Code
DATA
CRC CHECK
Signal Interval

Le calcul du ckecksum :

2.2 CRC CHECK: CRC check code is from Slave Address to end of the data. The calculation method is illustrated as follow:

(1) Load a 16-bit register with FFFF hex (all1's). Call this the CRC register.

(2) Exclusive OR the first 8-bit byte of the message with the low-order byte of the 16-bit CRC register, putting the result in the CRC register.

(3) Shift the CRC register one bit to the right (toward the LSB), Zero-filling the MSB, Extract and examines the LSB.

(4) (If the LSB was 0): Repeat Steps (3) (another shift) (If the LSB was 1): Exclusive OR the CRC register with the polynomial value A001 hex (1010 0000 0000 0001).

(5) Repeat Steps (3) and (4) until 8 shifts been performed. When this is done, a complete 8-bit byte will be processed.

(6) Repeat Steps (2) through (5) for next 8-bit byte of the message, Continue doing this until all bytes have been processed. The final content of the CRC register is the CRC value. Placing the CRC into the message: When the 16-bit CRC (2 8-bit bytes) is transmitted in the message, the low-order byte will be transmitted first, followed by the high-order byte, For example, if the CRC value is 1241 hex, the CRC-16 Upper put the 41h, the CRC-16 Lower put the 12h.

- **CRC calculation application program**

```
UWORD ch_sum ( UBYTE long , UBYTE *rxdbuff ) {
      BYTE i = 0;
      UWORD wkg = 0xFFFF;
      while ( long-- ) {
        wkg ^= rxdbuff++;
        for ( i = 0 ; i < 8; i++ ) {
            if ( wkg & 0x0001 ) {
               wkg = ( wkg >> 1 ) ^ 0xa001;
            }
            else {
               wkg = wkg >> 1;
            }
        }
     }
    return( wkg );
}
```

Le contenu des trames (code des commandes, signification des mots..)

5.5 Inverter Control

5.5.1 Command DATA (Readable and Writable)

Register Code		Bit	Content
0100H		Ready-to-use	
0101H	Operation Signal	0	Operation Command 1 : Run 0 : Stop
		1	Reverse Command 1 : Reverse 0 : Forward
		2	External Fault 1 : Fault (EFO)
		3	Fault Reset 1 : Reset
		4	Log Command 1 : Log
		5	Multi function Command S1 1 :"ON" (Define 5-00 Function)
		6	Multi function Command S2 1 :"ON" (Define 5-01 Function)
		7	Multi function Command S3 1 :"ON"(Define 5-02 Function)
		8	Multi function Command S4 1 :"ON"(Define 5-03 Function)
		9	Multi function Command S5 1 :"ON"(Define 5-04 Function)
		A	Multi function Command S6 1 :"ON"(Define 5-05 Function)
		B	Multi function Command AIN 1 :"ON"(Define 5-06 Function)
		C	Multi function Command 1 1 : R1A "ON" (Define 8-02 Function)
		D	Multi function Command 2 1 : R2A "ON" (Define 8-03 Function)
		E-F	(unused)
0102H		Frequency Command	
0103~011FH		Ready-to-use	

(Note) The unused Bit is defined as 0, the spare register is not available for writing Data.

5.5.2 Supervision Data (Only for reading)

Register code		Bit	Content
0120H	State Signal	0	Operation State 1 : Run 0 : Stop
		1	Direction State 1 : Reverse 0 : Forward
		2	Inverter operation prepare state 1 : ready 0 : unready
		3	Abnormal 1 : Abnormal
		4	DATA setting error 1 : Error
		5-F	(unused)

(Note) Please define the unused Bit as 0.

Register code	Content				
0121H	Error content	00	The inverter is normal		
		01	Program abnormal(CPF)	24	Under voltage during running (LV-C)
		02	EEPROM abnormal (EPR)	25 ~ 28 (unused)	
		03	Over voltage (OV)	29	(Err8)
		04	Under voltage(LV)	30	Stop at 0 Hz(STP0)
		05	Inverter over heat (OH)	31	Direct start disable (STP1)
		06 ~ 09 (unused)		32	Control panel emergency stop (STP2)
		10	Over current during decelerating (OC-D)	33	Emergency stop (E.S)
		11	Over current during accelerating (OC-A)	34	External BB(bb)
		12	Over current at constant speed (OC-C)	35	Auto testing error(ATER)
		13	Over voltage at constant speed / decelerating (OV-C)	36	PID feedback signal loss(PDER)
		14	Inverter over heat at constant speed (OH-C)	37	Communication error(EFO)
		15	Inverter over speed (OVSP)	38	Encoder signal loss (ECER) *1
		16	CPU interrupted (CTER)	39	Analog converting error(Err4)
		17	(OC_S)	40	Parameter locked(LOC)
		18~19 (Unused)		41	Keypad operation error (Err1)
		20	Over current at stop(OC)	42	Parameter setting error (Err2)
		21	Motor over load (OL1)	43	Modifying the parameter in communication(Err5)
		22	Inverter over load (OL2)	44	Communication failure (Err6)
		23	Over torque detected (OL3)	45	Parameter setting error (Err7)
0122H	Sequent input value	0	Terminal S1	1 : OFF	
		1	Terminal S2	1 : OFF	
		2	Terminal S3	1 : OFF	
		3	Terminal S4	1 : OFF	
		4	Terminal S5	1 : OFF	
		5	Terminal S6	1 : OFF	
		6	Terminal AIN	1 : OFF	
		7-9	(unused)		
	Terminal output	A	Multifunction output 1(RELAY1) (1 : R1A ON 0 : R1A OFF)		
		B	Multifunction output 2(RELAY2) (1 : R2A ON 0 : R2A OFF)		
		C~F	(Unused)		
0123H	Frequency command				
0124H	Output frequency				
0125H	Output voltage command (1/1V)				
0126H	Output DC voltage command (1/1V)				

Note) Please define the unused Bit as 0.

Register Code	Content
0127H	Output current (10/1A)
0128H	Reserved
0129H	Output torque
012AH	PID Feedback value (100% / Max output frequency, 10/1%)
012BH	PID input value (100% / Max output frequency, 10/1% , sign attached)
012CH	TM2 AIN input value (1024 / 10V) *1
012DH	TM2 AV2 input value (1024 / 10V) *1
012EH-012FH	Ready-to-use

(Note:) The ready-to-use register is not available for the data write.

5.5.3 Read the data in the holding register [03H]

Continuously read the data in the register from the specified address.

(e.g.) Read the frequency command from the SLAVE 1, inverter 7300CV.

RTU Mode

Command Signal

SLAVE Address		01 H
Function Code		03H
Start to encode	High	01H
	Low	23H
Data quantity	High	00H
	Low	01H
CRC-16	High	74H
	Low	3CH

Respond signal (Normally)

SLAVE Address		01H
Function Code		03H
DATA		02H
Initial holding register	High	17H
	Low	70H
CRC-16	High	AFH
	Low	82H

Respond signal (Error)

SLAVE Address		02H
Function Code		83H
Exception Code		52H
CRC-16	High	C0H
	Low	CDH

5.5.4 LOOP BACK CHECK [08H]

The check code checking the transmission of the signal between MASTER and SLAVE could be discretionary.

RTU Mode

Command Signal

SLAVE Address		01 H
Function Code		08H
Check Code	High	00H
	Low	00H
DATA	High	A5H
	Low	37H
CRC-16	High	DAH
	Low	8DH

Respond signal (Normally)

SLAVE Address		01H
Function Code		08H
Check Code	High	00H
	Low	00H
DATA	High	A5H
	Low	37H
CRC-16	High	DAH
	Low	8DH

Respond signal (Error)

SLAVE Address		01H
Function Code		88H
Exception Code		20H
CRC-16	High	47H
	Low	D8H

5.5.5Write to the holding register [06H]

Write the specified data to the holding register from the defined address.
(e.g.) write the frequency command 60.0Hz from PLC to SLAVE 1, inverter 7300CV.

RTU Mode

Command Signal

SLAVE Address		01 H
Function Code		06H
Start to encode	High	01H
	Low	02H
Data Quantity	High	17H
	Low	70H
CRC-16	High	27H
	Low	E2H

Respond signal (Normally)

SLAVE Address		01H
Function Code		06H
Start to encode	High	01H
	Low	02H
Data Quantity	High	17H
	Low	70H
CRC-16	High	27H
	Low	E2H

Respond signal (Error)

SLAVE Address		01H
Function Code		86H
Exception Code		52H
CRC-16	High	C3H
	Low	9DH

5.5.6 Write complex Number holding register [10H]

From the defined code, write the respective specified data to the holding registers.
e.g. Input the frequency command 'Running forward at 60.0Hz' into the SLAVE 1 V2 from PLC.

RTU Mode

Command Signal

SLAVE Address		01 H
Function Code		10H
Start to encode	High	01H
	Low	01H
Data quantity	High	00H
	Low	02H
DATA number *		04H
Primary DATA	High	00H
	Low	01H
Secondary DATA	High	17H
	Low	70H
CRC-16	High	60H
	Low	27H

Respond signal (Normally)

SLAVE Address		01H
Function Code		10H
Start to encode	High	01H
	Low	01H
Data quantity	High	00H
	Low	02H
CRC-16	High	11H
	Low	F4H

Respond signal (Error)

SLAVE Address		01H
Function Code		90H
Exception Code		52H
CRC-16	High	CDH
	Low	FDH

* 'DATA number' is equal to the 'data quantity' multiply 2.