



## 1. Overview

This specification sheet describes communication specifications between IHII turbo compressor control panel (Touch panel type Ver. 2.00) and host system. Except for scope of application, it is described as "Reserved".

## 2. Scope of Application

This specification applies to communication between compressor control panel and host system.



Fig.2-1(a) Outline Drawing of Connection (RS-232C Cable)

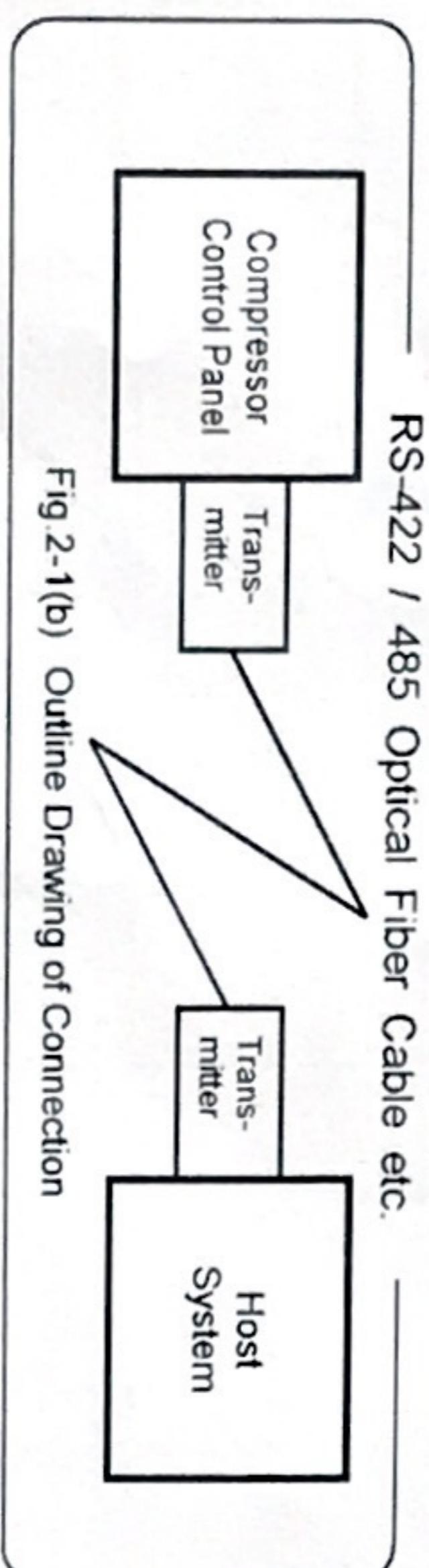


Fig.2-1(b) Outline Drawing of Connection

## 3. Communication Specification

Item	Contents
(1) Communication Method	Half Duplex
(2) Synchronizing Method	Asynchronous Mode
(3) Communication Rate	9600bps
(4) Data Bit	8bits, LSB First
(5) Start Bit	1bit
(6) Stop Bit	2bits
(7) Parity	Even
(8) Serial Communication Interface	EIA RS-232C, RS-422/485(Transmitter is required)
(9) Protocol	Non-Procedure
(10) Signal Line Laying Method	Show Fig.3-1(a), (b)
(11) Communication Cycle Time	Communication Interval more than 5sec

**⚠** Only the one-to-one communication between this control panel and host system is supported. The multi-dropped connection is not supported.

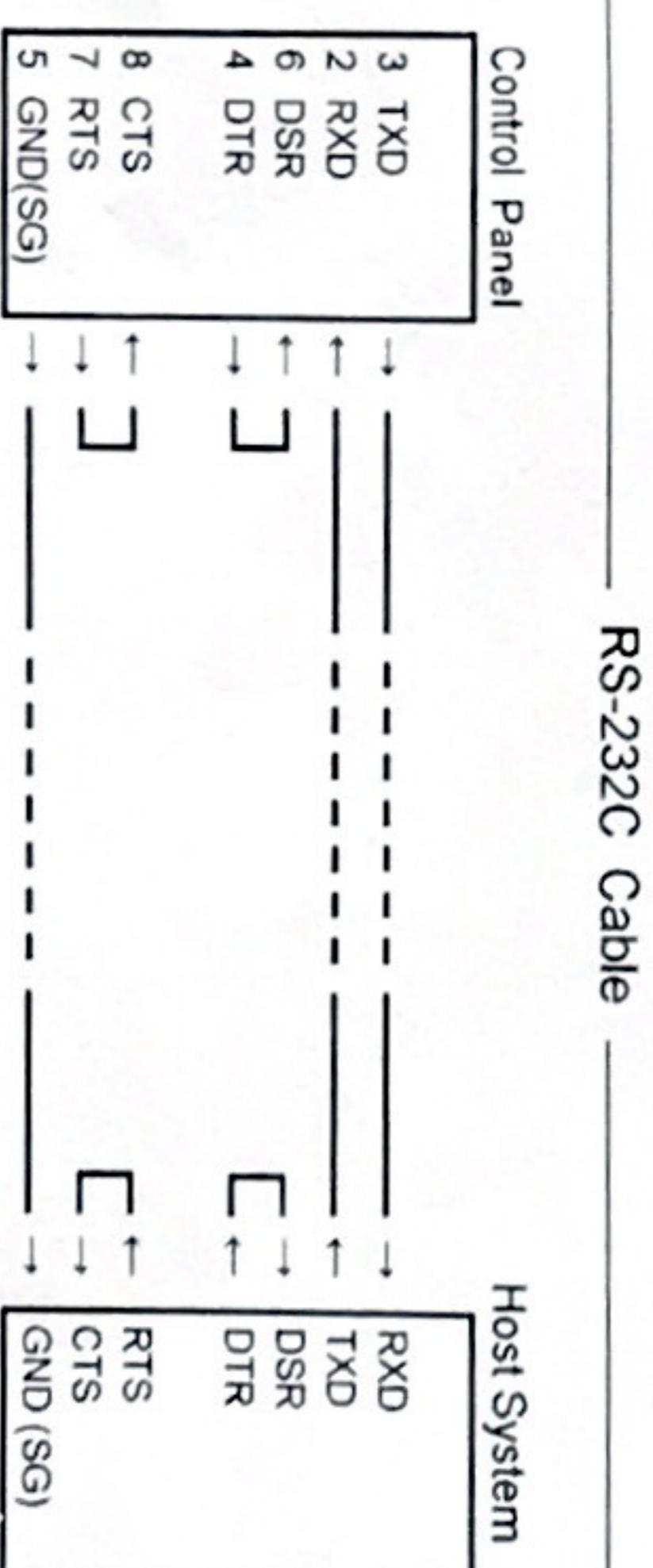


Fig.3-1(a) Connection Between Compressor Control Panel and Host System  
(RS-232C Cable)

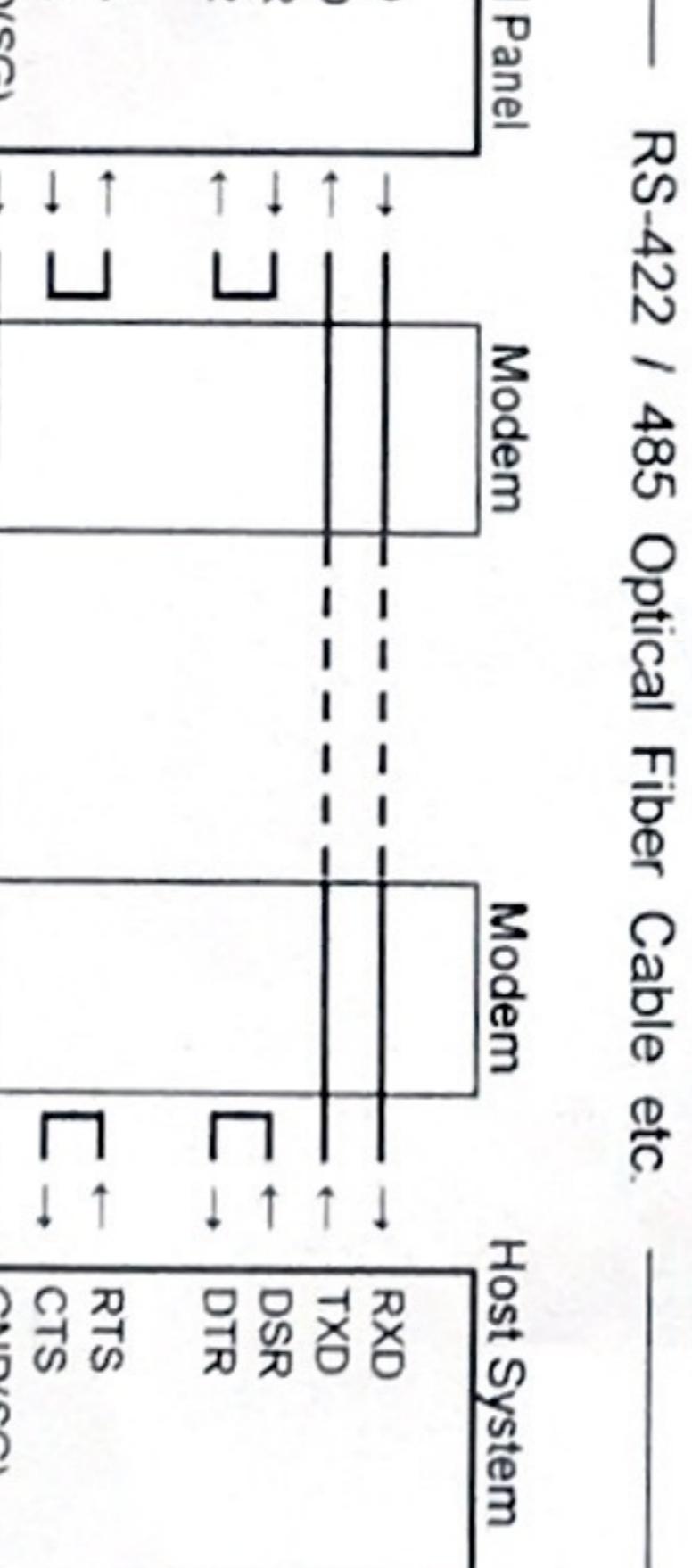


Fig.3-1(b) Connection Between Compressor Control Panel and Host System  
(RS-422 / 485 Optical Fiber Cable etc.)

CN004  
(D-sub 9 pin Male Connector)

Fig.3-2 Connector Pin Assignment of the Communication Port

#### 4. Communication Sequence

- (1) General Procedure (Establish connection and command from Host system to compressor control panel)



- (3) Receive Command  
 (4) Analysis Command  
 (5) Pick Up Data  
 (6) Transmit Data
- (Waiting for Response)
- (Waiting for Command)
- Response

- (Waiting for Response)
- Receive Data ⑦  
Data Display / Save ⑧

(Waiting for Next Command)

(Waiting for Command)

- ① Processing the Command Event on Host system  
Application Software

- ② Transfer the Read Command to Control Panel

- (Waiting for Response)
- (Waiting for Command)
- ③ Receiving Command  
④ Analysis the Received Command  
⑤ Pick Up the Commanded Data and Make the Transmitting Data  
⑥ Transmit Commanded Data
- (Waiting for Command)
- ⑦ Receive the Response Data from Control Panel  
⑧ Extract the Needed Data from Response Data, and Wait for the Next Process

- (2) General Procedure (Write command from host system to control panel)

Reserved

- (3) General Procedure (Read command from control panel to host system)

Reserved

- (4) General Procedure (Write command from control panel to host system)

Reserved

#### 5. Error Control

Command error and control are shown below.

- |  |   |
|--|---|
| ① Vertical Parity Error -----  | Discard the Data Frame by Control Panel |
| ② Horizontal Parity Error -----  | Discard the Data Frame by Control Panel |
| ③ Flame Size Error -----   | Discard the Data Frame by Control Panel |
| ④ Flag Error -----   | Discard the Data Frame by Control Panel |
| ⑤ Command Error -----  | Discard the Data Frame by Control Panel |
| ⑥ (4)Flag error is failure that command frame of header ":" or delimiter "CR", "LF". | Discard the Data Frame by Control Panel |

- (1) Read Command from Host System to Control Panel

- ① Communication Error from Host system to Compressor Control Panel (Read command)  
If command error occurs, compressor control panel that is receiver destroys all data packet, and compressor control panel becomes waiting command.

- ② Communication Error from Compressor Control Panel to Host system (Response)  
If command error occurs, please discard all data packet and executes the next process.

- (2) Write Command from Host System to Control Panel

- Reserved

- (3) Read Command from Control Panel to Host System

- Reserved

- (4) Write Command from Control panel to Host System

- Reserved

## 6. Communication Format

(1) Command Frame (Command)

0	1	2	3	4	5	6	7	8
:	CM	C <sub>0</sub>	C <sub>1</sub>	N <sub>0</sub>	N <sub>1</sub>	CK	CR	LF

9bytes  
Control Panel ← Host System

Command frame is 9bytes.								
Item	Contents	Note						
CM	Header(3Ah)	Fixed						
	Command ID	2 Commands are Available.						
		T(54h): Test Unit Ready						
		R(52h): Read from Target						
C <sub>0</sub> ~C <sub>1</sub>	Code	Operand of Command (Refer to next page)						
N <sub>0</sub> ~N <sub>1</sub>	Descriptor	Reserved(as 0(30h))						
CK	Horizontal Parity	XOR of Each 1byte from ":" to "N <sub>1</sub> "						
CR								
LF	Delimiter	Fixed						

(2) Data Frame (Response)

0	1	2	3	4	5	6	7	8
:	CM	C <sub>0</sub>	C <sub>1</sub>	N <sub>0</sub>	N <sub>1</sub>	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>

(9+n) bytes  
Control Panel → Host System

Data frames are changed by data stream length that is included it.

Item	Contents	Note
CM	Header(3Ah)	Fixed
	Command ID	Below-commands are Available.
		T(54h): Test Unit Ready
		R(52h): Read from Target
		W(57h): Write to Target (Reserved)
		Operand of Command (Refer to next page)
C <sub>0</sub> ~C <sub>1</sub>	Code	Reserved(as 0(30h))
N <sub>0</sub> ~N <sub>1</sub>	Descriptor	n Bytes Data(n > 1)
D <sub>0</sub> ~D <sub>n-1</sub>	Data Block	XOR of Each 1byte From ":" to "D <sub>n-1</sub> "
CK	Horizontal Parity	
CR		
LF	Delimiter	Fixed

[hex]: Hexadecimal ..... Received data becomes numerical value when convert it to decimal.

Ex.) HEX, 4bytes...[0][2][F][A]=76

These values are 2's complement. -762=[F][D][0][6]

[bin]: Binary ..... Convert received data to binary.

Ex.) BIN, 4bytes...[0][2][0][0]=[0000][0010][0000][0000]

Therefore, only 10th item is ON.

◆ Numerical data of Data Block

HEX of data block is used with 0(30h)~9(39h) and A(41h)~F(46h).

◆ Correspondence Mark by Compressor Type:

O: Standard

Δ: Option

## 7. Commands and Response

Control panel and host system send and receive the following commands and responses through the communication line.

Commands and responses are pairs. Response other than specified is void.

### List of Commands and Responses

Code No.	Command/Response	Sender	Bytes	Event/Cycle	Remark
C <sub>0</sub>	Communication Test (Command)	Remote	9	Event	Line status check at startup
1	0	(Response)	Panel	9	Command rate Minimum Interval: 5sec
2	1	Present Data Monitoring (Command)	Remote	9	Panel
2	4	Recall Data (Command)	Remote	9	(Response) Panel
			16 <sub>1</sub>	Event	When Compressor Detects Trouble

## 8. Communication Data

Refer to following pages for details of command data.

◆ Notation Mentioned:

[dec]: Decimal Number .... Data value is same as the receive value.

Ex.) DEC, 2bytes...[1][2]=12

## 6. Communication Format

### (1) Command Frame (Command)

0	1	2	3	4	5	6	7	8
: CM	C <sub>0</sub>	C <sub>1</sub>	N <sub>0</sub>	N <sub>1</sub>	CK	CCR	LF	

9bytes

Control Panel → Host System

Command frame is 9bytes.								
Item	Contents	Note						
:	Header(3Ah)	Fixed						
CM	Command ID	2 Commands are Available.						
		T(54h): Test Unit Ready R(52h): Read from Target						
C <sub>0</sub> ~C <sub>1</sub>	Code	Operand of Command (Refer to next page)						
N <sub>0</sub> ~N <sub>1</sub>	Descriptor	Reserved (as 0(30h))						
CK	Horizontal Parity	XOR of Each 1byte from ":" to "N <sub>1</sub> "						
CR								
LF	Delimiter	Fixed						

### (2) Data Frame (Response)

0	1	2	3	4	5	6	7	8
:	CM	C <sub>0</sub>	C <sub>1</sub>	N <sub>0</sub>	N <sub>1</sub>	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>

(9+n) bytes

Control Panel → Host System

### Data frames are changed by data stream length that is included it.

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Item	Contents	Note						
:	Header(3Ah)	Fixed						
CM	Command ID	Below-commands are Available.						
		T(54h): Test Unit Ready R(52h): Read from Target W(57h): Write to Target (Reserved)						
C <sub>0</sub> ~C <sub>1</sub>	Code	Operand of Command (Refer to next page)						
N <sub>0</sub> ~N <sub>1</sub>	Descriptor	Reserved(as 0(30h))						
D <sub>0</sub> ~D <sub>n-1</sub>	Data Block	n Bytes Data( n > 1 )						
CK	Horizontal Parity	XOR of Each 1byte From ":" to "D <sub>n-1</sub> "						
CR								
LF	Delimiter	Fixed						

## 7. Commands and Response

Control panel and host system send and receive the following commands and responses through the communication line.  
Commands and responses are pairs. Response other than specified is void.

### List of Commands and Responses

Code No.	Command / Response	Sender	Bytes	Event/Cycle	Remark
C <sub>0</sub> C <sub>1</sub>	Communication Test	(Command)	Remote	9	Line status check at startup
1 0		(Response)	Panel	9	Event
2 1	Present Data Monitoring	(Command)	Remote	9	Command rate Minimum Interval: 5sec
		(Response)	Panel	251	Cycle
2 4	Recall Data	(Command)	Remote	9	When Compressor Detects Trouble
		(Response)	Panel	161	Event

## 8. Communication Data

Refer to following pages for details of command data.

- Notation Mentioned:

[dec]: Decimal Number     Data value is same as the receive value.

Ex.) DEC, 2bytes...[1][2]=12

[hex]: Hexadecimal ..... Received data becomes numerical value when convert it to decimal.

Ex.) HEX, 4bytes...[0][2][F][A]=762

These values are 2's complement. -762=[F][D][0][6]

[bin]: Binary ..... Convert received data to binary..

Ex.) BIN, 4bytes...[0][2][0][0]=[0000][0010][0000][0000]

Therefore, only 10th item is ON.

- Numerical data of Data Block

HEX of data block is used with 0(30h)~9(39h) and A(41h)~F(46h).

- Correspondence Mark by Compressor Type:

## (1) Confirmation of Connecting (Command)

Title:	<u>Test of Ready (Command)</u>																																								
Purpose:	Command of Establish Connection																																								
	It is to confirm that check compressor control panel power and normal operation by host system.																																								
Sender:	Host System																																								
Receiver:	Compressor Control Panel																																								
Data Size:	9bytes																																								
Timing:	<p>① Startup</p> <p>② Host system Detects Error of Communication Line</p>																																								
	<table border="1"> <thead> <tr> <th colspan="2">Contents(Type)</th> <th>Bytes</th> <th>Address</th> </tr> </thead> <tbody> <tr> <td>Header</td> <td>Head</td> <td>: (3Ah)</td> <td>1 +0</td> </tr> <tr> <td></td> <td>Kind of Command</td> <td>T(54h)</td> <td>1 +1</td> </tr> <tr> <td></td> <td>Command Code</td> <td>1(31h)</td> <td>1 +2</td> </tr> <tr> <td></td> <td>Descriptor (Always "0")</td> <td>0(30h)</td> <td>1 +3</td> </tr> <tr> <td>Horizontal Parity</td> <td></td> <td>0(30h)</td> <td>1 +4</td> </tr> <tr> <td>Delimiter</td> <td></td> <td>0(6Fh)</td> <td>1 +6</td> </tr> <tr> <td></td> <td></td> <td>CR(0Dh)</td> <td>1 +7</td> </tr> <tr> <td></td> <td></td> <td>LF(0Ah)</td> <td>1 +8</td> </tr> <tr> <td></td> <td></td> <td></td> <td>1 +9</td> </tr> </tbody> </table>	Contents(Type)		Bytes	Address	Header	Head	: (3Ah)	1 +0		Kind of Command	T(54h)	1 +1		Command Code	1(31h)	1 +2		Descriptor (Always "0")	0(30h)	1 +3	Horizontal Parity		0(30h)	1 +4	Delimiter		0(6Fh)	1 +6			CR(0Dh)	1 +7			LF(0Ah)	1 +8				1 +9
Contents(Type)		Bytes	Address																																						
Header	Head	: (3Ah)	1 +0																																						
	Kind of Command	T(54h)	1 +1																																						
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	Descriptor (Always "0")	0(30h)	1 +3																																						
Horizontal Parity		0(30h)	1 +4																																						
Delimiter		0(6Fh)	1 +6																																						
		CR(0Dh)	1 +7																																						
		LF(0Ah)	1 +8																																						
			1 +9																																						

## (1) Confirmation of Connecting (Response)

Title:	<u>Test of Ready (Response)</u>		
Purpose:	Response the results of Test of Ready		
Sender:	Compressor Control Panel		
Receiver:	Host System		
Data Size:	9bytes		
Timing:	Reception of Command or Transmission of Result of Test of Ready		
	Contents(Type)	Bytes	Address
Header			
Head	: (3Ah)	1	+0
Kind of Command	OK..D(44h)	1	+1
Command Code	1(31h)	1	+2
Descriptor (Always "0")	0(30h)	1	+3
Horizontal Parity	0(30h)	1	+4
Delimiter			
DEL(7Fh)	1	+5	+6
CR(0Dh)	1	+7	+7
LF(0Ah)	1	+8	+8
		+9	

**(2) Present Data Monitoring (Command)****Communication Contents**

<b>Title:</b>	<b>Present Data Monitoring (Command)</b>		
<b>Purpose:</b>	Command of Present Data Monitoring		
<b>Sender:</b>	Host System		
<b>Receiver:</b>	Compressor Control Panel		
<b>Data Size:</b>	9bytes		
<b>Timing:</b>	After Establish Connection (Minimum Cycle: 5sec)		

Header	Contents(Type)	Bytes	Address
Head	: (3Ah)	1	+0
Kind of Command	R(52h)	1	+1
Command Code	2(32h)	1	+2
	1(31h)	1	+3
Descriptor (Always "0")	4	1	+4
	0(30h)	1	+5
Horizontal Parity	5	1	+6
Delimiter	k(6Bh)	1	+7
	CR(0Dh)	1	+8
	LF(0Ah)	1	+9

**(2) Present Data Monitoring (Response)****Communication Contents**

<b>Title:</b>	<b>Watching Data (Response)</b>		
<b>Purpose:</b>	Response of Present Data Monitoring		
<b>Sender:</b>	Compressor Control Panel		
<b>Receiver:</b>	Host System		
<b>Data Size:</b>	251bytes		
<b>Timing:</b>	Reception of Command of Transmission of Present Data Monitoring		

	Contents(Type)	Bytes	Notation	Unit	Address
Header	Head	1	: (3Ah)	1	+0
	Kind of Command	1	R(52h)	1	+1
	Command Code	1	2(32h)	1	+2
		1	1(31h)	1	+3
	Descriptor (Always "0")	1	4	1	+4
		0(30h)	0(30h)	1	+5
Present Time(Micro Computer Clock)	Year	4	dec	A.D.	+6
Decimal Display	Month	2	dec	+10	
Week Day:	Day	2	dec	+12	
0..SUN	1..MON	2	dec	+14	
1..MON	2..TUE	2	dec	+16	
2..TUE	3..WED	2	dec	+18	
3..WED	4..THU	2	dec	+20	
4..THU	5..FRI	2	dec	+22	
5..FRI	6..SAT	2	dec	+24	
6..SAT	Hour	2	dec	+26	
	Minute	2	dec	+28	
	Second	2	dec	+30	
Ex.) AUG/15(FRI)/2002 15:45:23					
Data:	2002 08 15 05 15 45 23				
0:TRE, 5:TA, 8:TAE, 9:Tx, 99:Other	Compressor Type	2	hex	+22	
1:Local, 2:Remote	Operation Place	2	hex	+24	
0:Auto Mode, 3:IGV Manual Mode	IGV Auto Surashu Manual	2	hex	+26	
0:BV Open, 1:BV Close, 2:BV Manual Mode, 3:BV Auto Mode	Blow-Off Valve(BV) Open / close	2	hex	+28	
0:Stop, 1:Waiting For Auto Start (After Power Failure), 2:Starting, 3:Running, 4:Ready for Stop, 5:Power Failure	Compressor Status	2	hex	+30	
0:Unload, 1:Loading, 2:Fix Unload, 3:Fix Full Load, 4:Forced Unload	Loading Status	2	hex	+32	
0:Start Prep OFF, 1:Prep to Start, 2:Ready to Run, 3:Running, 4:CO-OPE Starting, 5:Cool Down, 6:Ready to CO-OPE Run	Ready to Run	2	hex	+34	

Compressor Type		Tx	Compressor Type		Tx	Compressor Type		Tx
Tx		TRE	Contents(Type)			Contents(Type)		
O	O	Discharge Press. (System Press.)	4	hex	kPa	+36	O	O
O	O	Discharge Press. (Compressor Outlet)	4	hex	kPa	+40	O	O
O	O	Main Motor Current	4	hex	0.1A	+44	O	O
O	O	Lube Oil Press.	4	hex	kPa	+48	O	O
(Reserved)		(Reserved)	4	hex		+52	(Reserved)	
(Reserved)		(Reserved)	4	hex		+56	(Reserved)	
O	O	Lube Oil Temp. (Oil Cooler Outlet)	4	hex	0.1°C	+60	O	O
(Reserved)		(Reserved)	4	hex		+64	O	O
O	O	Final Stage Inlet Air Temp.	4	hex	0.1°C	+68	O	O
(Reserved)		(Reserved)	4	hex		+72	(Reserved)	
O	O	2 <sup>nd</sup> Stage Shaft Vibration	4	hex	0.1	+76	O	O
O	O	3 <sup>rd</sup> Stage Shaft Vibration	4	hex	0.1	+80	O	O
(Reserved)		Air Flow	4	hex	+84	Only No. 1, 2		O
(Reserved)		(Reserved)	4	hex	+88	(Reserved)		O
O	O	Const. Press. Control Set Point	4	hex	kPa	+196	O	O
(Reserved)		Unloading Discharge Press. (H) Set Point	4	hex	kPa	+200	(Reserved)	
O	O	Loading Discharge Press. (L) Set Point	4	hex	kPa	+204	O	O
O	O	Motor Anti Overload Current Control SP.	4	hex	0.1A	+208	O	O
O	O	Anti-Surge Lower Limit Current	4	hex	0.1A	+212	O	O
O	O	Anti-Surge Press Control SP.	4	hex	kPa	+216	O	O
(Reserved)		(Reserved)	4	hex	+100	(Reserved)		O
(Reserved)		(Reserved)	4	hex	+104	(Reserved)		O
Refer to other page		AUX Equipment Status	2	hex		+222	Refer to other page	
Refer to other page		Heavy Trouble (Trip)	8	hex		+224	Refer to other page	
O	O	IGV Positioner Signal	4	hex	0.1%	+112	O	O
△	△	Blow-Off Valve Positioner Signal	4	hex	0.1%	+116	Light Trouble (Alarm)	8
△	△	Remote Const.Press. Set Point	4	hex	kPa	+120	Maintain	8
(Reserved)		(Reserved)	4	hex		+124	Light Trouble (Alarm)	8
(Reserved)		(Reserved)	4	hex		+128	Maintain	8
(Reserved)		(Reserved)	4	hex		+132	Light Trouble (Alarm)	8
(Reserved)		(Reserved)	4	hex		+136	Light Trouble (Alarm)	8

Compressor Type	Tx	Compressor Type	Tx	Compressor Type	Tx
Running Hour	8	Notation	Bytes	Unit	Address
O	O	O	O	Hr	+136
Start Times	8	hex	Time		+144
O	O	O	O		
Loading Hour	8	hex	Hr		+152
O	O	O	O		
Loading Times	8	hex	Time		+160
O	O	O	O		
Lube Oil Press.	4	hex	kPa		+168
O	O	O	O		
Lube Oil Press. Lower Limit	4	hex	kPa		+172
(Reserved)	4	hex			
Lube Oil Temp.	4	hex	0.1°C		+176
O	O	O	O		
Higher Limit					
Each Stage Inlet Air Temp. Higher Limit	4	hex	0.1°C		+180
O	O	O	O		
Each Stage Shaft Vib. Higher Limit	4	hex	0.1		+184
O	O	O	O		
Vib. Higher Limit	μm				
(Reserved)	4	hex			+188
(Reserved)	4	hex			+192
Const. Press. Control Set Point	4	hex	kPa		+196
O	O	O	O		
Unloading Discharge Press. (H) Set Point	4	hex	kPa		+200
O	O	O	O		
Loading Discharge Press. (L) Set Point	4	hex	kPa		+204
O	O	O	O		
Motor Anti Overload Current Control SP.	4	hex	0.1A		+208
O	O	O	O		
Anti-Surge Lower Limit Current	4	hex	0.1A		+212
O	O	O	O		
Anti-Surge Press Control SP.	4	hex	kPa		+216
O	O	O	O		
(Reserved)	2	hex			+220
Refer to other page					
AUX Equipment Status	2	hex			+222
Heavy Trouble (Trip)	8	hex			+224
O	O	O	O		
Light Trouble (Alarm)	8	hex			+232
△	△	△	△		
Maintain	8	hex			+240
Light Trouble (Alarm)	8	hex			+248
△	△	△	△		
Light Trouble (Alarm)	8	hex			+256
Horizontal Parity	1				
Delimiter					
CR(0Dh)	1				+249
LF(0Ah)	1				+250
(Reserved)					+251

**(3) Recall Data Monitoring (Command)**

**Communication Contents**

Title:	<u>Recall Data (Command)</u>
Purpose:	Command of the Newest Recall data of Heavy Trouble (Trip)
Sender:	Host System
Receiver:	Compressor Control Panel
Data Size:	9bytes
Timing:	Heavy Trouble Occur

Header	Contents(Type)	Bytes	Address
Head	: (3Ah)	1	+0
Kind of Command	R(52h)	1	+1
Command Code	2(32h)	1	+2
Descriptor	4(34h)	1	+3
(Always"0")	0(30h)	1	+4
Horizontal Parity	n(6Eh)	1	+5
Delimiter	CR(0Dh)	1	+6
	LF(0Ah)	1	+7
		+8	
		+9	
Tx	TRE		
O	O	Discharge Press. (System Press.)	4 hex kPa +6
O	O	Discharge Press. (Compressor Outlet)	4 hex kPa +10
O	O	Main Motor Current	4 hex 0.1A +14
O	O	Lube Oil Press.	4 hex kPa +18
	(Reserved)	4 hex	+22
O	O	(Reserved)	4 hex +26
O	O	Lube Oil Temp. (Oil Cooler Outlet)	4 hex 0.1°C +30
O	O	(Reserved)	4 hex +34
O	O	Final Stage Inlet Air Temp. (Reserved)	4 hex 0.1°C +38
O	O	2 <sup>ND</sup> Stage Shaft Vibration	4 hex 0.1 μm +46
O	O	3 <sup>RD</sup> Stage Shaft Vibration (Reserved)	4 hex 0.1 μm +50 +54
	(Reserved)	4 hex	+58

**(3) Recall Data Monitoring (Response)**

**Communication Contents**

Title:	<u>Recall Data (Response)</u>
Purpose:	Response of the Newest Recall data of Heavy Trouble (Trip)
Sender:	Compressor Control Panel
Receiver:	Host System
Data Size:	161bytes
Timing:	Reception of Command of Transmission of Recall Data

Header	Contents(Type)	Bytes	Notation	Unit	Address
Head	: (3Ah)	1			+0
Kind of Command	D(44h)	1			+1
Command Code	2(32h)	1			+2
Descriptor	4(34h)	1			+3
(Always"0")	0(30h)	1			+4
Horizontal Parity	n(6Eh)	1			+5
Delimiter	CR(0Dh)	1			+6
	LF(0Ah)	1			+7
		+8			
		+9			
Tx	TRE				
O	O	Discharge Press. (System Press.)	4 hex	kPa	+6
O	O	Discharge Press. (Compressor Outlet)	4 hex	kPa	+10
O	O	Main Motor Current	4 hex	0.1A	+14
O	O	Lube Oil Press.	4 hex	kPa	+18
	(Reserved)	4 hex			+22
O	O	(Reserved)	4 hex		+26
O	O	Lube Oil Temp. (Oil Cooler Outlet)	4 hex	0.1°C	+30
O	O	(Reserved)	4 hex		+34
O	O	Final Stage Inlet Air Temp. (Reserved)	4 hex	0.1°C	+38
O	O	2 <sup>ND</sup> Stage Shaft Vibration	4 hex	0.1 μm	+46
O	O	3 <sup>RD</sup> Stage Shaft Vibration (Reserved)	4 hex	0.1 μm	+50 +54
	(Reserved)	4 hex			+58

#### (4) Bit Data Format

Bits information of each contents in command from control panel are shown below. Contents are "AUX. Equipment", "Heavy Trouble", "Light Trouble" and "Maintain". Some contents do not exist according to the compressor type and order specification.

Compressor Type	TRE	Contents(Type)	Bytes	Notation	Unit	Address
(Reserved)		(Reserved)	4	hex		+62
(Reserved)		(Reserved)	4	hex		+66
(Reserved)		(Reserved)	4	hex		+70
(Reserved)		(Reserved)	4	hex		+74
(Reserved)		(Reserved)	4	hex		+78
O	O	IGV Positioner Signal	4	hex	0..1%	+82
△	△	Blow-Off Valve Positioner Signal	4	hex	0..1%	+86
△	△	Remote Const. Press. Set Point	4	hex	kPa	+90
(Reserved)		(Reserved)	4	hex		+94
(Reserved)		(Reserved)	4	hex		+98
Running Hour		Running Hour	8	hex	Hr	+102
O	O	Start Times	8	hex	Times	+110
O	O	Loading Hour	8	hex	Hr	+118
O	O	Loading Times	8	hex	Times	+126
O	O	Year	4	dec	A.D.	+134
Time when Heavy Trouble Occur (Microcomputer clock) Decimal Display						
Week Day: 0..SUN						
1..MON		Month	2	dec		+138
2..TUE		Day	2	dec		+140
3..WED		Week Day	2	dec		+142
4..THU		Hour	2	dec		+144
5..FRI		Minute	2	dec		+146
6..SAT		Second	2	dec		+148
Ex.) AUG/15(FRI)/2002 15:45:23						
Data:	2002 08 15 05 15 45 23	Heavy Trouble Contents	8	hex		+150
(Refer to next page for details)						
Horizontal Parity						
Delimiter		CR(0DH)	1			+159
		LF(0AH)	1			+160
		(Reserved)				+161

#### List of Heavy Trouble (Trip)

Bit	Contents	Compressor Type	
		Tx	TRE
1 (LSB)	EX. Low Lube Oil Press.(LL)	1:Running, 2:Stop	O
2	EX. High Lube Oil Temp.(HH)	If both bits are OFF, not exist lube oil heater.	O
3	(Reserved)		O
4	EX. High Final Stage Inlet Temp.(HH)	If both bits are OFF, not exist exhaust fan.	△
5	(Reserved)		△
6	EX. High 2 <sup>nd</sup> Stage Shaft Vibration (HH)		O
7	EX. High 3 <sup>rd</sup> Stage Shaft Vibration (HH)		O
8	Main Motor Trouble		O
9	Emergency Stop		O
10	Power Failure		△
11	Sensor Trouble		△
12	Other Fault(1)		△
13	Other Fault(2)		△
14	Other Fault(3)		△
15	Other Fault(4) (Exhaust Fan Over Load)		△
16(MSB)	Other Fault(5) (Ventilation Fan Over Load)		△

### List of High Trouble (Alarm)

Bit	Contents	Compressor Type	
		Tx	TRE
1 (LSB)	Low Lube Oil Press.(L)	O	O
2	High Lube Oil Temp.(H)	O	O
3 (Reserved)			
4	High Final Stage Inlet Temp.(H)	O	O
5 (Reserved)			
6	High 2 <sup>ND</sup> Stage Shaft Vibration (H)	O	O
7	High 3 <sup>RD</sup> Stage Shaft Vibration (H)	O	O
8	AUX.Oil Pump Over Load	O	O
9	High Suction Air Filter ΔPress.	Δ	Δ
10 (Reserved)			
11 (Reserved)			
12	Other Fault (1)	O	O
13	Other Fault (2)	O	O
14	Other Fault (3)	O	O
15	Other Fault (4) (Exhaust Fan Over Load)	O	O
16	Other Fault (5) (Ventilation Fan Over Load)	O	O
17	Discharge Air Press. Sensor Trouble	O	O
18	Lube Oil Press. Sensor Trouble	O	O
19	3 <sup>RD</sup> Stage Vibration Sensor Trouble	O	O
20	Main Motor Current Sensor Trouble	O	O
21	Final Stage Inlet Air Temp. Sensor Trouble	O	O
22	Lube Oil Temp. Sensor Trouble	O	O
23 (Reserved)			
24	2 <sup>ND</sup> Stage Vibration Sensor Trouble	O	O
25 (Reserved)			
26	System Air Press. Signal Trouble	Δ	Δ
27	Remote Press. Set Point Signal Trouble	Δ	Δ
28			
29			
30 (Reserved)			
31 32(MSB)			

### List of Maintain

Bit	Contents	Compressor Type	
		Tx	TRE
1 (LSB)	Clean/Exchange Suction Air Filter	O	O
2	Motor Answer-Back Error (Check motor starter)	O	O
3	Power Failure	O	O
4	CO-OPE Run Failure	O	O
5			
6			
7 (Reserved)			
8 (MSB)			

### 9. Table of ASCII Code

MSB4BITS							
0	1	2	3	4	5	6	7
0 NUL	DLE	SP	0	@	P	·	P
1 SOH	DC1	! 1	A	Q	a	Q	
2 STX	DC2	" 2	B	R	b	R	
3 ETX	DC3	# 3	C	S	c	S	
4 EOT	DC4	\$ 4	D	T	d	T	
5 ENQ	NAK	% 5	E	U	e	U	
6 ACK	SYN	& 6	F	V	f	V	
7 BEL	ETB	· 7	G	W	g	W	
8 BS	CAN	( 8	H	X	h	X	
9 HT	EM	) 9	I	Y	i	Y	
A LF	SUB	* :	J	Z	j	Z	
B VT	ESC	+ :	K	[	k	{	
C FF	FS	, <	L	¥	l	—	
D CR	GS	- =	M	J	m	}	
E SO	RS	> N	^	n	~		
F SI	US	/ ?	O	—	o	DEL	

### 10. Horizontal Parity Account

Ex.) Present Data Monitoring (Command)

Command / Data			(Divide the Command / Data)							
ASCII	Hex	Bin	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1
:	3A	00111010	0	0	1	1	1	0	1	0
R	52	01010010	0	1	0	1	0	0	1	0
2	32	00110010	0	0	1	1	0	0	1	0
1	31	00110001	0	0	1	1	0	0	0	0
0	30	00110000	0	0	1	1	0	0	0	0
0	30	00110000	0	0	1	1	0	0	0	0

Binary Data										
bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1			
0	0	1	1	1	0	1	0			
0	1	0	1	0	0	0	1			
0	0	1	1	0	0	0	0			
0	0	1	1	0	0	0	0			
0	0	1	1	0	0	0	0			
0	0	1	1	0	0	0	0			
0	0	1	1	0	0	0	0			
0	0	1	1	0	0	0	0			
0	0	1	1	0	0	0	0			

Calculate XOR at Each Bits

Horizontal Parity							
k	6B	01101011	0	1	1	0	1