

SPECIFICATIONS AND DRAWINGS

SHIPYARD : ZHEJIANG ZHENXING SHIPBUILDING
& REPAIR CO., LTD.

SHIP NO. : 2306

MESSRS. : AKASAKA DIESEL S LIMITED

RULE : CCS (BRC)

PAINT. COLOR : 7.5BG7/2 (FITED TO HULL)
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AKASAKA A41S (E. No. 2022)
M-800-VII MAIN ENGINE REMOTE CONTROL SYSTEM
(WITH GEP CONVERTER)

Nabtesco Corporation

SPECIFICATIONS
FOR
M-800-VII MAIN ENGINE REMOTE CONTROL SYSTEM

MAIN ENGINE: AKASAKA A41S (E. No. 2022)
(WITH GEP CONVERTER)

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SHIP NO. : 2306
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REMARKS : COMMUNICATION PROTOCOL OF
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Nabtesco Corporation
MARINE CONTROL SYSTEMS COMPANY
DESIGN DEPARTMENT

—	A1 Ver.1.0	—	2023 7/3	高杉	竹村	三木	竹下
REV. MARK	NOTE		DATE	DESIGNED	CHK.	APVD.	

1. General

This remote control system provides the following performances of the main engine and the reduction gear with a micro-computer from wheel house, control room and engine side by operating a single telegraph transmitter, telegraph receiver or change over switch : speed setting electrically – pneumatically ; ahead-astern changeover of the reduction gear electrically – pneumatically.

The start and stop of the main engine can be carried out from control room or engine side.

Furthermore, the back up control system is provided to control of the main engine and the reduction gear from the control room at failure of the remote control system.

In addition, there is provided with a safety system which automatically stop or slow down the main engine under electric–pneumatic control at emergency such as abnormal condition of the main engine.

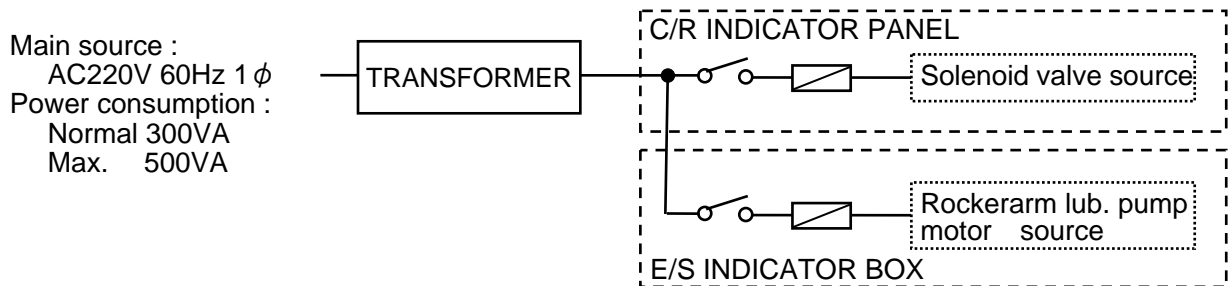
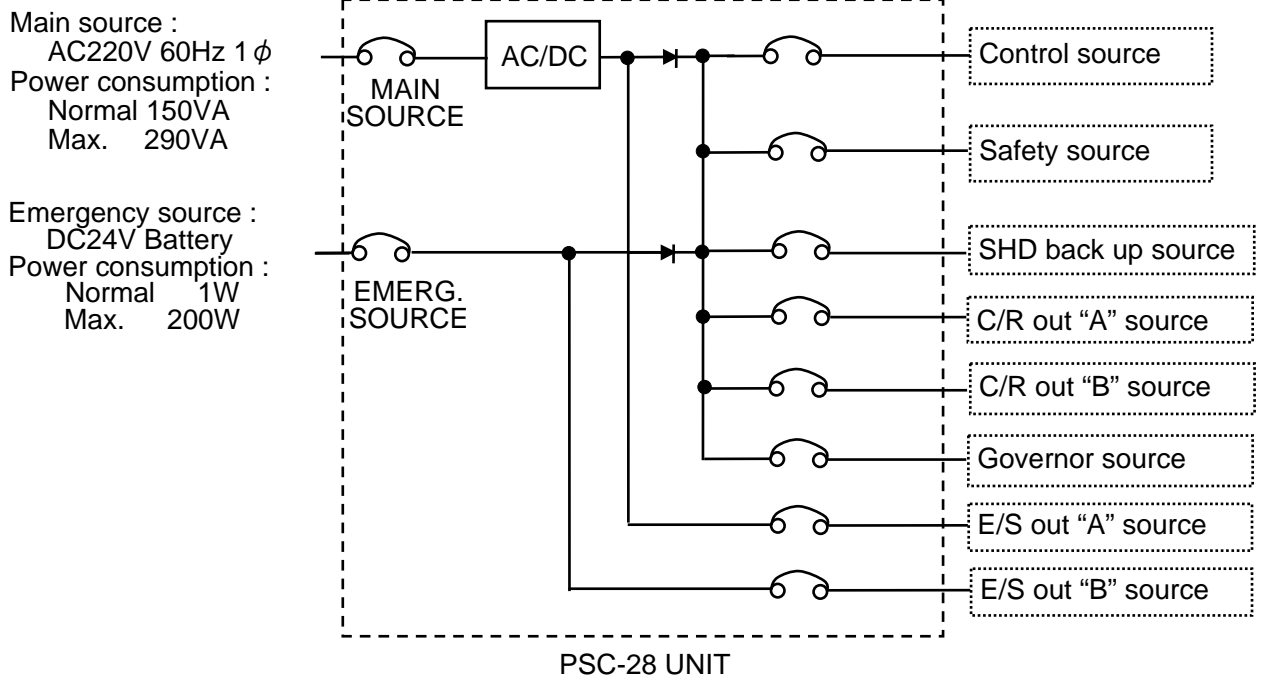
Furthermore, a manual emergency stop device is provided to be able to stop the main engine under electric–pneumatic control for emergency such as failure of the remote control system.

2. Maneuvering Method

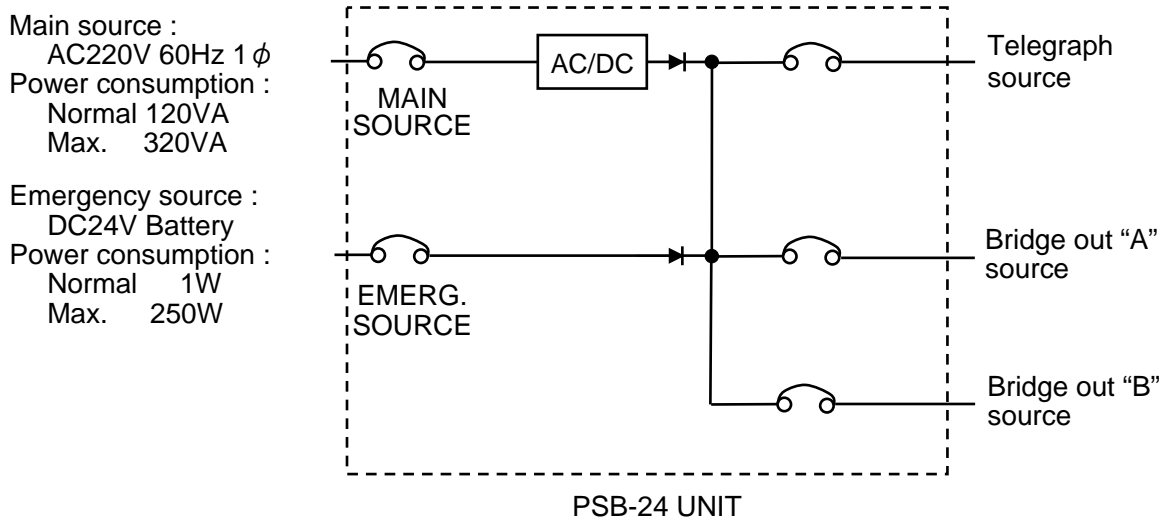
	Ahead-astern changeover of reduction gear	Speed control	Start/stop	Safety system
W/H	Automatic control by means of telegraph transmitter (Micro-computer – pneumatic control)	Governor control by electric signal from telegraph transmitter (Micro-computer – pneumatic control)	Manual control by means of the start – stop switch	Manual emergency stop
C/R	Automatic control by means of telegraph receiver (Micro-computer – pneumatic control)	Governor control by electric signal from telegraph receiver (Micro-computer – pneumatic control)		Automatic emergency stop
C/R (Back up control)	Automatic control by means of telegraph receiver (Electric – pneumatic control)	Governor control by electric signal from telegraph receiver (Electric – pneumatic control)	Manual control by means of the starting and stopping valve	Automatic emergency slow down
E/S	Manual control by means of changeover switch in E/S. (Electric – pneumatic control)	Governor control by electric signal from UP-DOWN switch in E/S. (Electric – pneumatic control)		Manual emergency stop
E/S (Emergency)	Manual control by means of changeover switch in E/S.	Fuel regulating shaft control by fuel handle		Automatic emergency stop

3. Electric Source

a) Control room power supply unit and transformer



b) Bridge power supply unit



4. Change-over of Control Position

	E/S cont. position C/O switch	C/R cont. position C/O switch	W/H illum. P.B. W/H	W/H & C/R & E/S Indicator lamp				Buzzer & Gong	Control position	Remarks
				E/S	BACK UP	C/R	W/H			
E/S ↓ C/R	E/S	C/R		○					E/S	NOTE③
	REMOTE	"				○		⋈	C/R	
	"	"				○			"	2sec. later
C/R ↓ W/H	"	"				○			"	
	"	W/H				○	◎	⋈	C/R	NOTE①②
	"	"	□				○		W/H	
W/H ↓ C/R	"	"					○		W/H	
	"	C/R				◎		⋈	C/R	NOTE②
	"	"				○			"	2sec. later
C/R ↓ B/U	"	"				○			"	
	"	BACK UP			*○	○			BACK UP	NOTE④
B/U ↓ C/R	"	"			*○	○			"	
	"	C/R				○			C/R	NOTE④
C/R ↓ E/S	"	"				○			"	NOTE③
	E/S	"		○				⋈	E/S	
	"	"		○					"	2sec. later

- : Push button switch operation
 ○ : Indicator lamp continuous lighting
 *○ : Indicate on C/R only
 ◎ : Indicator lamp flickering
 ⋈ : Telegraph buzzer and gong sounding

NOTE ① Change - over of control position from C/R to W/H can not be made unless the following conditions are satisfied.

- a) The emergency stop is unoperating condition.
- b) The electric source AC and DC are in normal condition.
- c) The control and safety system is in normal condition.
[The details are described later, refer to 5-1-(8) and 6-(5),except
"Minor Failure" (for control or safety).]
- d) GEP converter is in normal condition.
- e) The control air pressure is in normal condition.

If the illuminated push button switch "W/H" in W/H is pressed while this indication lamp is flickering, buzzer sounding and indicator lamp flickering are stopped, resulting in W/H control condition. If any of the above items a)~e) becomes imperfect, alarm of「IMPERFECT W/H CONT. CONDITION」is given. In this case, however it is recommended to transfer the control position to C/R since performing W/H control under the imperfect condition has a possibility to lead dangerous accident.

NOTE ② With main engine running, to change over from W/H to C/R and vice versa, the change-over switch should be operated after handle matching by the matching indicator lamp on C/R display panel.
If the speed setting is not matching, M/E speed fluctuates.

NOTE ③ Change - over of control position from E/S to C/R can not be made unless the following conditions are satisfied.

- a) Telegraph handle in C/R is the same position as a RR/G.

If this condition is not satisfied, the control position "C/R" indicator flashes and the telegraph buzzer and gong continues to sound.

NOTE ④ In case of control electric source failure or CPU abnormal, the control mode changeover to backup control according to the following procedure.

- a) Operating the Control & Mode Position Changeover Switch to Backup Mode position.(It is necessary to pull and turn its switch(lever) on Control Room Indicator Panel.)

5. Control system

5-1. Wheel House Control

(1) The ahead - astern changeover the reduction gear

By operating the telegraph transmitter into ahead (astern) position, the reduction gear changeover into the ahead (astern) position.

The following procedure is to be taken.

- ① By putting the telegraph transmitter in wheel house to the ahead (astern) position.
- ② The ahead (astern) engage solenoid valve for reduction gear is energized under the interlock conditions for ahead (astern) engage are satisfied and the reduction gear change-over into the ahead (astern) position.
- ③ By detecting the reduction gear change-over into ahead (astern) position completely, the indicating lamp for reduction gear "NEUTRAL" flashes and "AHEAD" ("ASTERN") light on.
- ④ By detecting the reduction gear drive oil pressure, the indicating lamp for reduction gear "NEUTRAL" light off, and the main engine speed is set at the equivalent telegraph transmitter position.

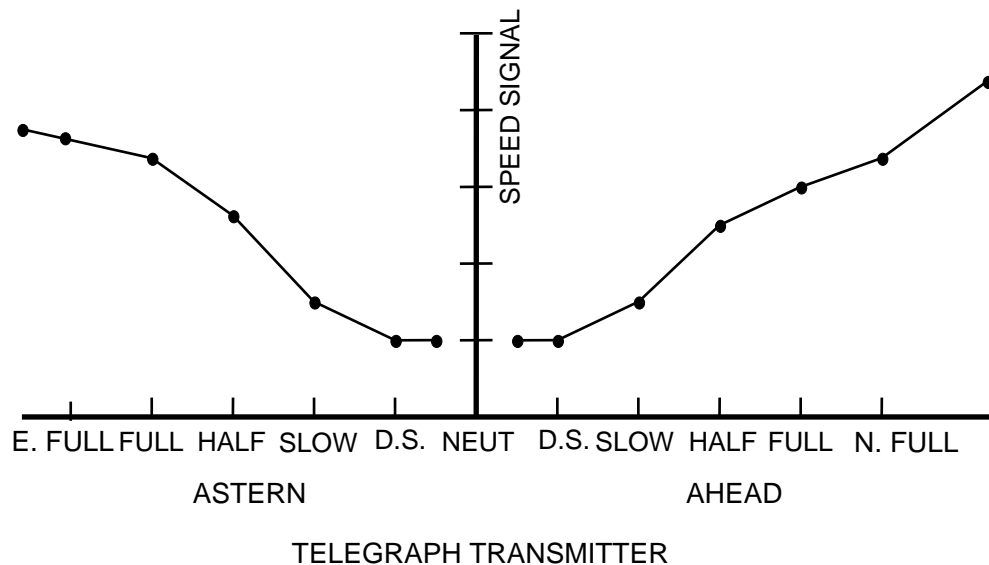
(2) Speed control

• Control of harbor speed

By putting the telegraph transmitter into the optional position, the main engine speed corresponding with that position is set due to governor control.

Usually operation of the telegraph transmitter is set into the central position of each instruction division, but the engine speed can be changed continuously by putting it into every other position.

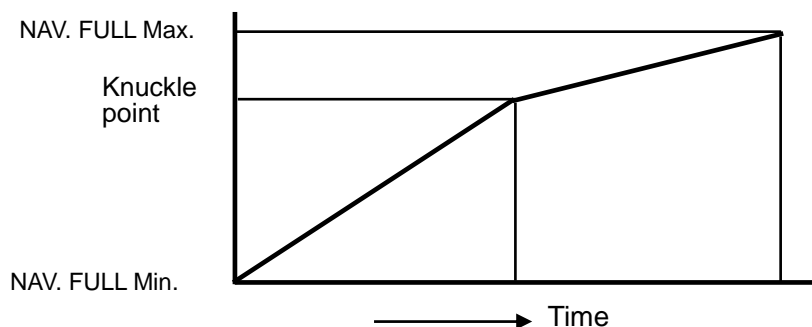
The relation between transmitter position and engine speed set point is defined by programmed function curves to offer smooth speed regulation. (See below)



• Programmed speed increase toward to navigation speed (Two stage program)

By putting the telegraph transmitter to the position of NAV. FULL, the main engine is accelerated instantly as far as the load up program starting position, but it is gradually accelerated over that position up to the telegraph transmitter position selected due to the program loading up mechanism.

The indicator lamp "LOAD UP PROGRAM" lights during operating load up the program mechanism.



• Programmed speed decrease from navigation speed

By reducing operation of the telegraph transmitter from over than load program starting position of NAV. FULL, the main engine is gradually decelerated as far as the load program starting position due to the program loading down mechanism, and it is instantly decelerated less than that position as far as equivalent to the telegraph transmitter position.

The indicator lamp "LOAD DOWN PROGRAM" lights during loading down the program. In case that the telegraph transmitter is operated into less than HARBOR FULL (including stop and astern side), the program loading down mechanism does not operate.

• Program cancel

By pushing either of the load program cancel push button switches provided in the B/R display panel (BDP) unit or the C/R display panel (CDP) unit, the indicator lamp turns on and the program loading mechanism does not operate even in the case that the telegraph handle is operated to the load program position. Then main engine is accelerated instantly up or down the telegraph transmitter position.

By pushing again the load program cancel switch, the indicator lamp goes off and the normal condition recovers.

The cancel switch in W/H is available during W/H control condition, and that in C/R is available during C/R control condition.

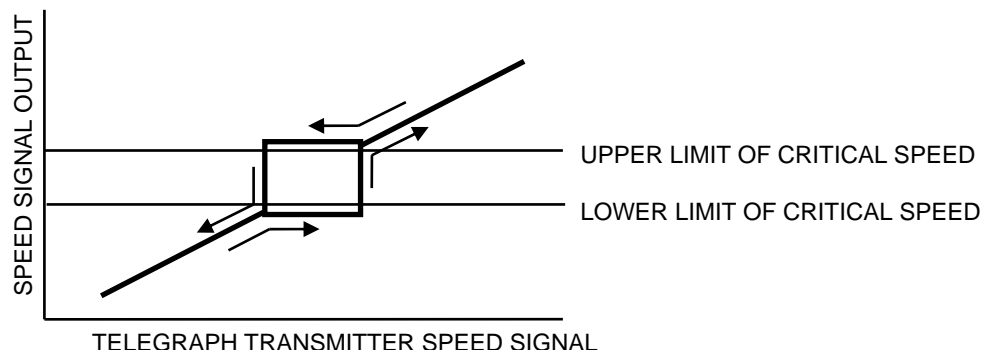
• Limit of setting revolution

For W/H control, upper limit of setting revolution can only be adjusted within limited setting value by the telegraph receiver in control room.

The main engine can no longer be accelerated over the preset limit regardless of telegraph transmitter order. The indicator lamp "SPEED LIMIT" light.

• Quick passage device of critical speed range

Critical speed ranges are protected by a speed jump signal through side ranges. (Refer to below)



(3) Control system monitoring function

In each case of the following conditions, the alarm of "CONTROL SYSTEM ABNORMAL" is given, and the main engine maintains the existing state of things and the each cause is displayed on the C/R display panel (CDP).

- ① Micro-computer CPU hard abnormal.
- ② Telegraph transmitter encoder disconnection.
- ③ Telegraph receiver encoder disconnection.
- ④ Communication abnormal.
- ⑤ Revolution signal (for control system) abnormal.
- ⑥ GEP converter abnormal.

The "Major Failure" or the "Minor Failure" is displayed on the B/R display panel (BDP) & C/R display panel (CDP) by the kind of abnormal cause.

When the abnormal cause is backed up by SUB SYSTEM, "MINOR FAILURE" is displayed.

When both MAIN and SUB SYSTEM are abnormal condition, "MAJOR FAILURE" is displayed.

- The cause of "Minor Failure"
 - ① Either Main or Sub Communication abnormal.
 - ② Either Main or Sub Revolution signal (for control) abnormal.
- The cause of "Major Failure"
 - ① Micro-computer CPU hard for control system abnormal.
 - ② Both Main and Sub Communication abnormal.
 - ③ Telegraph transmitter/receiver encoder disconnection.
 - ④ Both Main and Sub Revolution signal (for control) abnormal.
 - ⑤ GEP converter abnormal.

(4) Influence of source failure to the remote control system
(W/H control and C/R control)

If any of electric power fails or the control air press. is low, the main engine will become as indicated below.

Abnormal	M/E control functions				Remarks
	AH / AS Changeover of reduction gear	Speed setting	Start/stop	Emergency stopping (by stop cylinder)	
Remocon AC power failure	○	○	○	○	Automatically changed over to DC power (emerg. source) and operation will be continued
Remocon DC power failure	○	○	○	○	No influence
Remocon AC/DC power failure	×	×	×	×	Keep the present condition
Control air press. low	×	×	×	×	Keep the present condition
Sol. valve AC power failure	○	○	×	○	Cannot start/stop only

○ : Available
× : Not available

5-2. C/R automatic control

The C/R automatic control can be carried out in the way as wheel house control by means of the telegraph receiver and additional functions as below.

(1) Starting

Starting cannot be made unless the following conditions are satisfied.

By operating the M/E CONTROL switch to "START" position on the C/R indicator panel, the start solenoid valve is energized and the starting air is supplied to the main engine.

When the main engine speed reaches the running level, the signal of start solenoid valve is released.

Starting interlock conditions

When the following conditions are satisfied, the start interlock solenoid valve will turn on.

- ① The control position is set to "CONTROL ROOM" position
- ② Turning gear is in the position of "DISENGAGE"
- ③ Emergency shut down solenoid valve is not work condition
- ④ C/R Telegraph handle and RR/G is "NEUTRAL" position
- ⑤ Starting air intermediate valve is OPEN

Then, after the start is complete, return the switch to the "RUN" position.

(2) Starting failure

It is deemed starting impossible that the M/E speed does not reach to running level within a preset time after operating the M/E CONTROL switch to "START" position, whereupon the start solenoid valve is de-energized and alarm of "STARTING FAILURE" is given.

Reset of starting failure state is made by following operation.

Operating the M/E CONTROL switch to "STOP" position.

(3) Stopping

By operating the M/E CONTROL switch to "STOP" position on the C/R indicator panel, the stop solenoid valve is energized and the fuel oil is cut off to stop the main engine.

(4) Air running

Pushing the "AIR RUN" buttons on the C/R indicator panel will cause the main engine to run by air. However, when the telegraph receiver is placed out of the "NEUTRAL" position or the interlock conditions are not released, pushing the button will not cause the main engine to run by air.

5-3. C/R back-up control

If a failure occurs in any device for the control system (such as micro-computers for control, encoders in the telegraph transmitter and receiver), the back up control device on the C/R console can be used changeover the reduction gear, starting, stopping and speed control of the main engine. (A change over switch is provided for starting and stopping, and the telegraph receiver for changeover the reduction gear and speed control.)

(1) The ahead- astern changeover the reduction gear

The same control as during C/R AUTO operation is possible with the C/R receiver.

(2) Speed setting

By operating the telegraph receiver into optional position, the main engine speed corresponding with that position is set due to GEP converter. This function is independent of the micro computer system.

Since the load program acceleration and deceleration are not provided, then main engine speed is increased or decreased into the navigation speed by operating the telegraph receiver slowly together with its fine adjusting knob.

(3) Starting and stopping

The same control as during C/R AUTO operation is possible with the change over switch.

(4) Air running

The same control as during C/R AUTO operation is possible with the "AIR RUN" buttons on the C/R indicator panel.

6.Safety System

(1) Manual emergency stop

• Function of manual emergency stop

Manual emergency stop switches are provided in the following area.

- ① W/H : Illuminated push button switch (with cover)
(By pushing, switch operates and indicator lamp lights.
And by pushing again, switch returns and indicator lamp fails.)
- ② C/R : Illuminated push button switch (with cover)
(By pushing, switch operates and indicator lamp lights.
And by pushing again, switch returns and indicator lamp fails.)

With abovementioned switch operated, the solenoid valve for emergency stop is energized and the stop cylinder is worked, so that the fuel is cut off to stop the engine. At the same time, alarm of "EMERG. STOP" is given.

This manual emergency stop may be operated regardless of the control position.

• Reset of manual emergency stop

Reset is operated according to the following procedure.

- ① In case of W/H control :
Changeover the control position to C/R or E/S.
Then, perform reset operation in ECR or E/S.
- ② In case of C/R control :
Return the manual emergency stop switch, and operate the M/E control switch on C/R to the "STOP" position.
- ③ In case of E/S control :
Return the manual emergency stop switch, and operate the fuel handle on engine side to "STOP" position.

(2) Automatic emergency stop

▪ Function of automatic emergency stop

In case of the following condition, the solenoid valve for emergency stop is energized and the stop cylinder is worked, so that the main engine automatically stops with the fuel cut off.

And also, the governor shut down signal is given.

- ① Over speed
- ② SH-1 : M/E lubricating oil low pressure
- ③ SH-2 : T/C lubricating oil low pressure
- ④ SH-3 : RR/G lubricating oil low pressure
- ⑤ SH-4 : RR/G lubricating oil high temperature
- ⑥ SH-5 : Oil mist high density

In case of over speed, emergency stop instantly operates. In case the others, emergency stop operates after abnormal condition continues for a preset time. If the automatic emergency stop operates, the alarm of "EMERG. STOP" is given. This automatic emergency stop operates regardless of the control position.

▪ Override of automatic emergency stop

In case of items ③, ④, ⑤ and ⑥ are set as cancel among abovementioned causes of automatic emergency stop, the automatic emergency stop can be overridden by operating either of "EMERG. STOP OVERRIDE" switches (illuminated push button switch-by pushing, switch operates and indicator lamp lights. And by pushing again, switch returns and indicator lamp fails) provided on the W/H or C/R.

Due to this overriding operation, the main engine can be run again even still in abnormal condition.

The override switches in W/H and in C/R are available regardless of the control position.

The emergency stop override function is effective before or after automatic emergency stop operation.

▪ Reset of automatic emergency stop

Reset operation is given below. Resetting is impossible unless the abnormal variable has returned to normal.

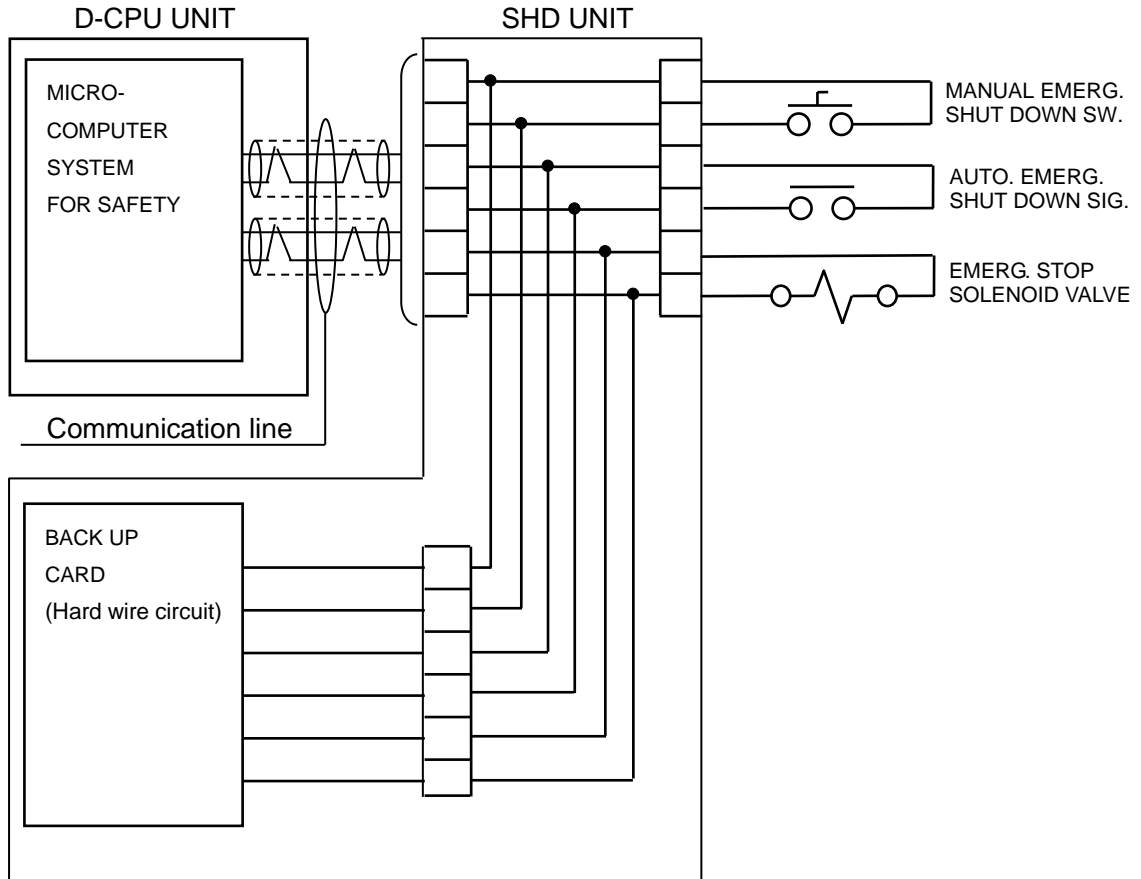
- ① In case of W/H control :
Changeover the control position to C/R or E/S.
Then, perform reset operation in ECR or E/S.
- ② In case of C/R control :
Operate the M/E control switch on C/R to the "STOP" position.
- ③ In case of E/S control :
Operate the fuel handle on engine side to "STOP" position.

▪ Prewarning of automatic emergency stop

"EMERG. STOP PREWARNING" alarm is given for a preset time before automatic emergency stop operation. (except above -mentioned ① and ②.)

(3) Back up System(Hard wire) for Safety System

If the micro-computer becomes abnormal, the back up system will take over the operation of shutting down the main engine for the manual and automatic emergency stop causes ;



Reset of emergency stop

If the micro-computer has been failed and then an emergency Shut down operated by the back up system, an emergency Shut down can be reset by the ordinary reset procedures described on item 6-(1) and 6-(2).

- (4) Automatic emergency slow down
(operate at W/H control or control room control condition)

• Function of automatic emergency slow down

When any of the following abnormal conditions continued for a preset time, the main engine is slowed down automatically to SLOW speed.

This function is available when main engine is running at Ahead side.

- ① SL-1 : Oil mist high density
- ② SL-2 : M/E jacket C.W. low pressure
- ③ SL-3 : M/E exh. gas each cyl. out high temperature
- ④ SL-4 : M/E jacket C.W. each cyl. out high temperature

If the automatic emergency slow down operates, the alarm of "AUTO. SLOW DOWN" is given.

• Override of automatic emergency slow down

The automatic emergency slow down can be overridden by operating either of "AUTO. SLOW DOWN OVERRIDE" switches (illuminated push button switch-by pushing, switch operates and indicator lamp lights. And by pushing again, switch turns and indicator lamp fails) provided on the W/H and C/R.

Due to this operation, the engine can be run again at equivalence with the telegraph handle (W/H or C/R) position even still in abnormal condition.

The override switches in W/H and in C/R are available regardless of the control position.

The slow down override function is effective before or after automatic emergency slow down operation.

• Reset of automatic emergency slow down

Resetting is accomplished by returning the telegraph handle in the charge of control (W/H or C/R) less than "SLOW" position.

However, resetting is unable unless the abnormal condition has returned normal.

• Prewarning of automatic emergency slow down

"SLOW DOWN PREWARNING" alarm is given for a preset time before automatic slow down operation.

• Function of "SLOW DOWN REQUEST" alarm

In case of above item "AUTO. SLOW DOWN" is occurred under following condition, the alarm of "SLOW DOWN REQUEST" is given. Then, the maneuvering handle should be returned into less than "SLOW".

- ① E/S control
- ② C/R back-up control
- ③ Auto. emergency slow down cancel is operated
- ④ Astern running condition

(5) Safety system monitoring function

In each case of the following conditions, the alarm of "SAFETY SYSTEM ABNORMAL" is given and the indication of each cause is displayed on the CDP unit.

- ① Micro-computer CPU hard abnormal.
- ② Emergency stop solenoid valve circuit trouble.
- ③ Communication abnormal.
- ④ Revolution signal (for safety system) abnormal.
- ⑤ Automatic emergency shut down solenoid valve circuit disconnection.

The "Major Failure" or the "Minor Failure" is displayed on the B/R display panel (BDP) & C/R display panel (CDP) by the kind of abnormal cause.

When the abnormal cause is backed up by SUB SYSTEM, "MINOR FAILURE" is displayed.

When both MAIN and SUB SYSTEM are abnormal condition, "MAJOR FAILURE" is displayed.

- The cause of "Minor Failure"
 - ① Either Main or Sub Communication abnormal.
 - ② Either Main or Sub Revolution signal (for safety system) abnormal.
- The cause of "Major Failure"
 - ① Micro-computer CPU hard for safety system abnormal.
 - ② Emergency stop solenoid valve circuit trouble.
 - ③ Both Main and Sub Communication abnormal.
 - ④ Both Main and Sub Revolution signal (for safety system) abnormal.
 - ⑤ Automatic emergency shut down solenoid valve circuit disconnection.

(6) Critical speed alarm

Upon a preset time after the engine speed going between the lower limit and the upper limit of the critical speed range, the alarm of "CRITICAL SPEED" is given.

(7) Wheel house alarm repose

In case of the wheel house sub telegraph "F/E" is ordered, the wheel house alarm is reposed except "TELEGRAPH SOURCE FAIL." alarm.

(8) Engine speed test for safety

Engine speed test switch is provided on the CDP unit.
And simulation test of engine revolution on the safety system is able to apply.

Note : It does not become the engine speed test condition during the main engine is running.

7. Telegraph

(1) Main telegraph

• Fitting

The equipment for the main telegraph are provided in the following areas.

- ① W/H : Illuminated lever type transmitter (With buzzer)
- ② C/R : Illuminated lever type receiver (With buzzer)
- ③ E/S : LED indicate and push button reply type receiver, Gong

• Division

Ahead side	DEAD SLOW, SLOW, HALF, FULL, NAV. FULL
Astern side	DEAD SLOW, SLOW, HALF, FULL, EMERGENCY FULL
And	NEUTRAL

• Function

- ① In case of C/R or E/S control, when the transmitter is operated, the ordered division flickers and the buzzer and gong sound.
Next, by replying with the receiver, the ordered division turns continuous lighting and the buzzer and gong stop sounding.
- ② In case of W/H control, the buzzer and gong sound for 2 seconds at the new order and ordered division lights continuously. C/R or E/S is not necessary to reply.

(2) Sub telegraph

• Fitting

The equipment for the sub telegraph are provided in the following area.

- ① W/H : LED and push button type transmitter
(Installed in telegraph transmitter)
- ② C/R : LED and push button type receiver
(Installed in telegraph receiver)
Push button switch for sound stop
(Installed in telegraph receiver)
- ③ E/S : LED and push button type receiver
Push button switch for sound stop

The buzzer and gong for main telegraph are common.

• Division

Finished with Engine	: (F/E)
Stand By	: (S/B)
Run up	: (R/U)

• Function

By pushing the push button switch for transmitter in the W/H, the LED that is ordered division flickers, and the buzzer and gong sound.

Under this condition, by pushing the push button switch for receiver that is ordered division, the LED turns continuous lighting, and the buzzer and gong stop sounding.

In case of S/B order, by pushing the sound stop push button switch before replying, the buzzer and gong stop sounding but the LED keeps flickering.

Under this condition, by pushing the push button switch of receiver that is ordered division, the LED turns continuous lighting, and the buzzer and gong sound for 2 seconds.

(3) Telegraph logger

This logger is to monitor positions of the main and sub telegraph constantly, and to print the new order and answer, as it variations, with the control position and the time. Printed sample is referred to the print out format of telegraph logger.

Operation pattern of main telegraph at wheel house control

	B/R TRANSMITTER	C/R RECEIVER	E/S RECEIVER	SOUND
W/H ORDER				≪ 2sec

- : LAMP CONTINUOUS LIGHTING
- ⊙ : LAMP FLICKERING FOR 2 SECONDS
- ≪ : AUDIBLE EQUIPMENT SOUNDING
- ▭ : TELEGRAPH LEVER POSITION
- NT : E/S TELEGRAPH RECEIVER SWITCH NOT OPERATION

Operation pattern of main telegraph at control room control

	W/H TRANSMITTER	C/R RECEIVER	E/S RECEIVER	SOUND
ANSWER CONDITION				
W/H ORDER				«
C/R ANSWER				
C/R ORDER				«
W/H ANSWER				

- : LAMP CONTINUOUS LIGHTING
- ⊙ : LAMP FLICKERING
- « : AUDIBLE EQUIPMENT SOUNDING
- ▬ : TELEGRAPH LEVER POSITION
- NT : E/S TELEGRAPH RECEIVER SWITCH NOT OPERATION

Operation pattern of main telegraph at engine side control

	W/H TRANSMITTER	C/R RECEIVER	E/S RECEIVER	SOUND
ANSWER CONDITION				
W/H ORDER				«
E/S ANSWER				
E/S ORDER				«
W/H ANSWER				

- : LAMP CONTINUOUS LIGHTING
- ⊙ : LAMP FLICKERING
- « : AUDIBLE EQUIPMENT SOUNDING
- ▬ : TELEGRAPH LEVER POSITION
- NT : E/S TELEGRAPH RECEIVER SWITCH OPERATION

Operation pattern of sub-telegraph (In case of W/H or C/R control)

ORDER			ANSWER			C/R S/B SOUND STOP	W/H LAMP			C/R LAMP			E/S LAMP			BUZZER & GONG	REMARK
FE	SB	RU	FE	SB	RU		FE	SB	RU	FE	SB	RU	FE	SB	RU		
							○			○			○				←
	□							◎			◎			○		«	
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			□				○			○			○				└

Operation pattern of sub-telegraph (In case of E/S control)

ORDER			ANSWER			C/R S/B SOUND STOP	W/H LAMP			C/R LAMP			E/S LAMP			BUZZER & GONG	REMARK
FE	SB	RU	FE	SB	RU		FE	SB	RU	FE	SB	RU	FE	SB	RU		
							○			○			○				←
	□							◎			○			◎		«	
						□		◎			○			◎			
				□				○			○			○		« 2sec	
		□							◎			○			◎	«	
					□				○			○			○		
	□							◎			○			◎		«	
				□				○			○			○			
□							◎			○			◎			«	
			□				○			○			○				└

Symbol

- : Lamp on
- ◎ : Lamp flicker
- : Push button operation
- « : Buzzer & gong sound

The diagram illustrates the telegraph system's message flow. A central log records all messages, while side panels show the current status of the telegraph and control positions.

Station	Time	Status
A	17-08-2013 10:16:30	C NEUT
P	17-08-2013 10:16:30	C F.W.ENG.
B	17-08-2013 10:32:30	C STAND BY
C	@ 17-08-2013 10:33:30	C STAND BY
	17-08-2013 10:34:30	C D.SLOW -AH
@	17-08-2013 10:35:30	C D.SLOW -AH
	17-08-2013 10:36:00	C SLOW -AH
@	17-08-2013 11:05:30	C SLOW -AH
	17-08-2013 11:06:00	C HALF -AH
@	17-08-2013 11:49:30	C HALF -AH
	17-08-2013 11:50:00	C FULL -AH
@	17-08-2013 12:23:00	C FULL -AH
	17-08-2013 12:24:00	C N. FULL -AH
@	17-08-2013 12:55:30	C N. FULL -AH
	17-08-2013 12:56:00	C RUN UP
@	17-08-2013 13:27:00	C RUN UP
	17-08-2013 22:38:30	C NEUT
D	@ 17-08-2013 22:39:00	C NEUT
	17-08-2013 22:45:30	C F.W.ENG.
@	17-08-2013 22:45:30	C F.W.ENG.
E	T 18-08-2013 08:46:00	B NEUT
	T 18-08-2013 08:46:00	B F.W.ENG.
	18-08-2013 08:50:00	B STAND BY
@	18-08-2013 08:50:30	B STAND BY
	18-08-2013 08:52:00	B D.SLOW -AS
	18-08-2013 09:05:30	B SLOW -AS
	18-08-2013 09:17:00	B NEUT
	18-08-2013 10:10:00	B D.SLOW -AH
F	18-08-2013 10:15:30	
	18-08-2013 10:46:00	B SLOW -AH
	18-08-2013 10:57:00	B HALF -AH
	18-08-2013 11:08:30	B FULL -AH

SUB TELEGRAPH		PRINT
1. FINISHED WITH ENG.		F.W.ENG.
2. STAND BY		STAND BY
3. RUN UP		RUN UP

MAIN TELEGRAPH		PRINT
1. AHEAD NAV. FULL		N. FULL-AH
2. AHEAD FULL		FULL -AH
3. AHEAD HALF		HALF -AH
4. AHEAD SLOW		SLOW -AH
5. AHEAD DEAD SLOW		D.SLOW-AH
6. NEUTRAL		NEUT
7. ASTERN DEAD SLOW		D.SLOW-AS
8. ASTERN SLOW		SLOW -AS
9. ASTERN HALF		HALF -AS
10. ASTERN FULL		FULL -AS
11. EMERG. FULL		EMERG. FULL

CONTROL POSITION		PRINT
1. WHEEL HOUSE		B
2. CONTROL ROOM		C
3. ENGINE SIDE		E

- A : IN CASE OF POWER SUPPLIED
B : ORDER (PAINTING COLOR : BLACK)
C : ANSWER (PAINTING COLOR : BLACK)
D : ANSWER MARK
E : TEST PRINT MARK
F : TIME PRINT
G : POWER SUPPLIED MARK
H : DAY
I : TIME
J : CONTROL POSITION
K : TELEGRAPH POSITION

MODBUS Communication Protocol between AMS and M-800- V/VII Remote Control System (RS-485 Version)

Nabtesco Corporation

Marine Control Systems Company
Engineering Dept.

c	セ ZH:1-9 頁ニ M-800-VII ヲ追加スル	B	2022 11/24	Y.J	高杉	T.S	榊原
b	セ ZH:修正スル	B	2020 4/3	間嶋	—	榊原	竹下
ax3	ミ ZH アナログフォーマットを別ページに移動する	B	2013 5/8	杉浦	—	藤原	竹下
—	—	—	2012 3/13	杉浦	—	藤原	加藤
記号	来歴		日付	担当	検図	承認	

ED

		74H65617-01

1 Summary

This document is written for MODBUS communication protocol to connect with M-800-V/VII Remote Control System.

2 Hardware Specification

The specification of hardware is below.

Table 1

Interface	RS485 / 2-wire / half duplex
Baud Rate	19200bps
Data Bit	8
Stop Bit	1
Parity	None

The telecommunications lines are duplicated. Each line is called as “main line” and “sub line”. The wiring sample is as follows.

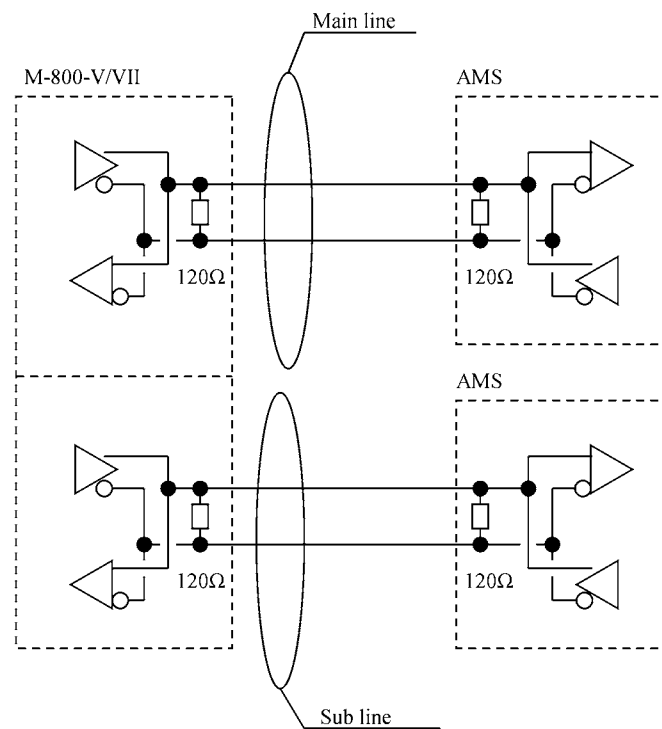


Fig. 1

		74H65617-01

3 MODBUS Protocol

3.1 Outline

RTU mode is used for this protocol. The specification is written below.

Table 2

Modbus mode	RTU(binary mode)	
Master station	AMS	
Slave station	M-800-V/VII	
M-800- V/VII Modbus address	1	
Function code	To M-800- V/VII digital	fc-15
	To M-800- V/VII analog	fc-16
	From M-800- V/VII digital	fc-02
	From M-800- V/VII analog	fc-04
Response Time	Within 100ms	
Message Timeout	500ms	
Retry	5 times	

3.2 Sequence

Communication sequence is shown in Fig.2 and Fig. 3.

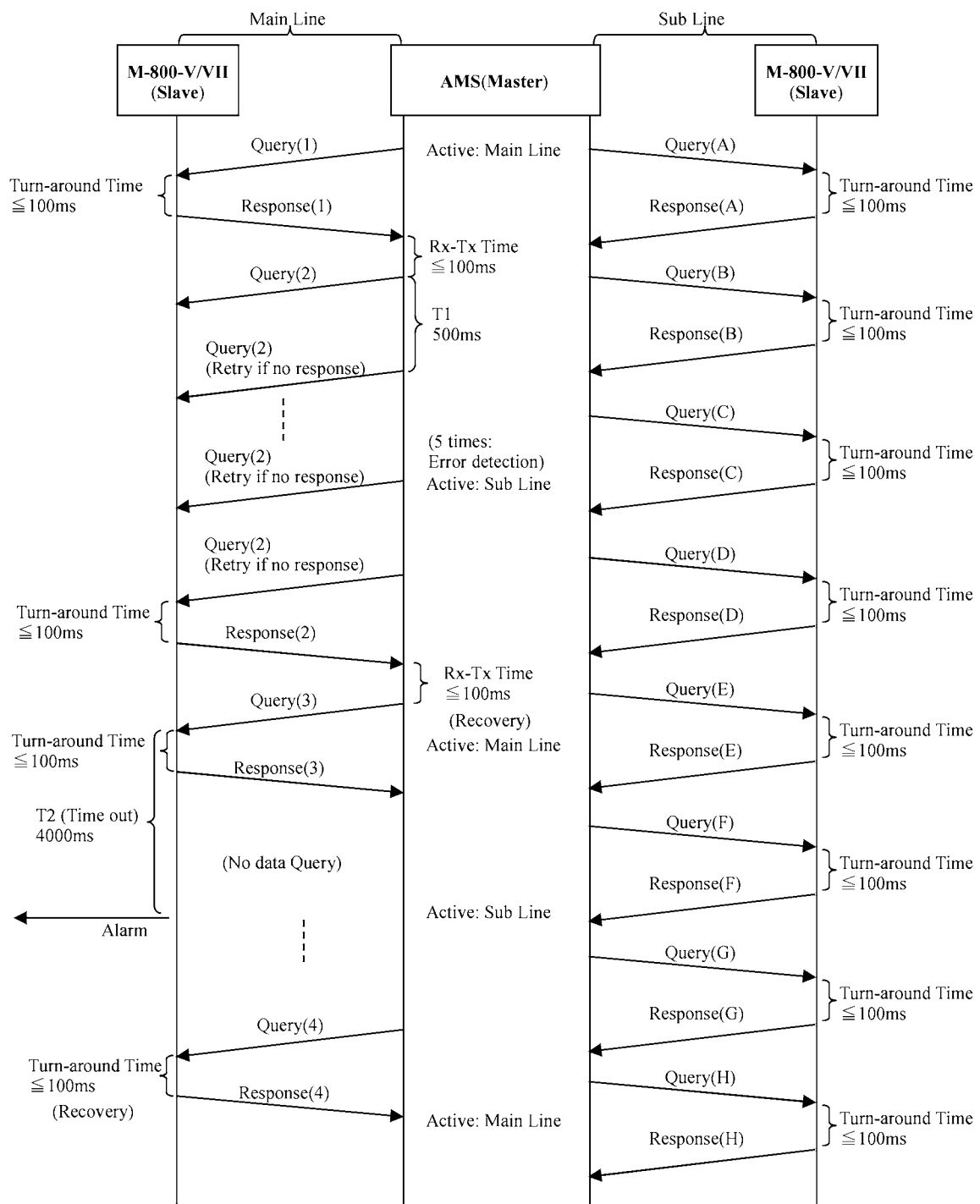


Fig. 2

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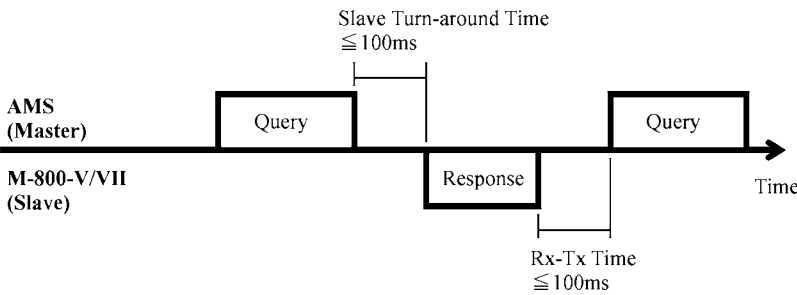


Fig. 3

3.3 Select Line

AMS always sends query message at main and sub lines. If AMS receives response message from both lines, AMS uses main line's data. If AMS doesn't receive response message 5 times from main line, AMS regards main line as error and uses sub line's data. According to the communication statement, active line changes as following table.

Table 3		
Main line	Sub line	Active line
Normal	Normal	Main line
Normal	Abnormal	Main line
Abnormal	Normal	Sub line
Abnormal	Abnormal	---

		74H65617-01

4 Detail of MODBUS Message

4.1 Digital Signal from M-800-V/VII

To read digital data from M-800-V/VII, function code 02 is used.

The discrete inputs in the response message are packed as one input per bit of the data field.
Status is indicated as 1= ON; 0= OFF.

[Message sample]

4.1.1 Query

Table 4

Field Name	Example(Hex)
Station number	01
Function code	02
Starting address (Upper)	00
Starting address (Lower)	00
Quantity of inputs (Upper)	00
Quantity of inputs (Lower)	16
CRC (Lower)	F9
CRC (Upper)	C4

4.1.2 Response

Table 5

Field Name	Example(Hex)
Station number	01
Function code	02
Byte count	03
Data (10008-10001)	FF
Data (10016-10009)	AA
Data (10022-10017)	05
CRC (Lower)	F6
CRC (Upper)	DD

		74H65617-01

4.2 Analog Signal from M-800-V/VII



To read analog data from M-800-V/VII, function code 04 is used. Refer to chapter 4.5 for analog data format.

[Message sample]

4.2.1 Query

Table 6

Field Name	Example(Hex)
Station number	01
Function code	04
Starting address (Upper)	00
Starting address (Lower)	00
Quantity of input registers (Upper)	00
Quantity of input registers (Lower)	02
CRC (Lower)	71
CRC (Upper)	CB

4.2.2 Response

Table 7

Field Name	Example(Hex)
Station number	01
Function code	04
Byte count	04
Data 30001 (Upper)	05
Data 30001 (Lower)	9C
Data 30002 (Upper)	01
Data 30002 (Lower)	23
CRC (Lower)	7B
CRC (Upper)	2F

		74H65617-01

4.3 Digital Signal to M-800- V/VII

To set the digital data to M-800-V/VII, function code 15 is used.

The requested ON/OFF states are specified by contents of the request data field.

A logical "1" in a bit position of the field requests the corresponding output to be ON.

A logical "0" requests it to be OFF.

This message sends when data is changed or every 1 minute.

[Message sample]

4.3.1 Query

Table 8

Field Name	Example(Hex)
Station number	01
Function code	0F
Starting address (Upper)	00
Starting address (Lower)	00
Quantity of outputs (Upper)	00
Quantity of outputs (Lower)	16
Byte count	03
Data (8-1)	AA
Data (16-9)	55
Data (22-17)	3F
CRC (Lower)	76
CRC (Upper)	D5

4.3.2 Response

Table 9

Field Name	Example(Hex)
Station number	01
Function code	0F
Starting address (Upper)	00
Starting address (Lower)	00
Quantity of outputs (Upper)	00
Quantity of outputs (Lower)	16
CRC (Lower)	D4
CRC (Upper)	05

		74H65617-01

4.4 Analog Signal to M-800- V/VII

To set analog data to M-800- V/VII, function code 16 is used.



Refer to chapter 4.5 for analog data format. This message is sent cyclically (according to each project specification).

[Message sample]

4.4.1 Query

Table 10

Field Name	Example(Hex)
Station number	01
Function code	10
Starting address (Upper)	00
Starting address (Lower)	00
Quantity of registers (Upper)	00
Quantity of registers (Lower)	02
Byte count	04
Data 40001 (Upper)	05
Data 40001 (Lower)	9C
Data 40002 (Upper)	01
Data 40002 (Lower)	23
CRC (Lower)	73
CRC (Upper)	04

4.4.2 Response

Table 11

Field Name	Example(Hex)
Station number	01
Function code	10
Starting address (Upper)	00
Starting address (Lower)	00
Quantity of registers (Upper)	00
Quantity of registers (Lower)	02
CRC (Lower)	41
CRC (Upper)	C8

		74H65617-01



4.5 Analog Data Format

Analog data is assigned 16 bits data. Data format is shown in the following.

Table 12

bit15(MSB)	bit14 .. bit0(LSB)
SF(Signal fail)	15bit integer, 2's compliment
SF(Signal failure) ----	0 : Normal 1 : fail

< Examples >

MSB															LSB	Decimal Value (SF)
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (Normal)
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (fail)
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1 (Normal)
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-1 (Normal)
0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	10 (Normal)
0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	-10 (Normal)
0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16383 (Normal)
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16384 (Normal)

If the analog data have decimal point, sender multiply the data by the predetermined value to become integer. Receiver divides the data by predetermined value.

For example, when predetermined resolution value is "0.01" and communication analog value is "123", the analog data is "1.23".

Communication protocol of VDR
IEC 61162-1 (Forth edition - 2010)
IACS RECOMMENDATION 85

Nabtesco Corporation
Marine Control Systems Company
Engineering Dept.

—			2015 12/3	T. S		榊原	竹下
REV. MARK	NOTE		DATE	DESIGNED		CHK.	APVD.

		74SS48959-61E

1. General

A serial communication signal to VDR is outputted from the RS422 interface of the M/E remote control system in the communication setting of table 1.

There are the output sentences shown in table 2 that are based on IEC61162.

But specification to output an ALA sentence every 1 minute is Nabtesco original.

In addition, the number of alarm 『900』 (Manual shutdown), 『901』 (slowdown request) and 『902』 (wrong way) of an ALA sentence (Sub-system: OT) are Nabtesco original specifications.

The number of alarm 『903』 (start air low pressure), 『904』 (shut down prewarning) and 『905』 (slow down prewarning) of an ALA sentence (Sub-system: OT) are IACS's recommendation.

Method	Asynchronous
Data bits	8
Start bits	1
Stop bits	1
Parity	None
Baud rate	4800bps
Characters	ASCII

Table 1 Communication setting

Sentence	Standard	System
PRC (Propulsion control)	IEC 61162-1(Forth Edition)	Remote control system
RPM (Revolutions)		
ALA (Alarm condition)		
ETL (Telegraph operation)		

Table 2 Output sentences

		74SS48959-61E

2. PRC Sentence (Propulsion remote control status)

0 1 2 3 4 5 6 7 8 9
 \$--PRC, x. x, a, x. x, a, x. x, a, a, x, *hh <CR><LF>

Field No.	Data form	Field name	Output data
0	\$--PRC	Header	『\$RCPRC』
1	x. x	Lever demand position	『』 : Null
2	a	Data status	『V』 : Invalid
3	x. x	RPM demand	『-799.9』 ~ 『799.9』 : [rpm]
4	a	Data status	『R』 : Revolutions[rpm] (Valid) 『V』 : Invalid
5	x. x	Pitch demand	『』 : Null
6	a	Data status	『V』 : Invalid
7	a	Operating location	『』 : Null
8	x	Number of shaft	『0』 ~ 『3』 : 0 =single, center : Odd =starboard : Even =port
9	*hh	Checksum	『00』 ~ 『FF』 : Except '\$' and the one on and after '*'

※Transmitting interval : 1sec

※In case of AHEAD 56.0 rpm of RPM orders. : 『\$RCPRC, , V, 56.0, R, , V, , 0*2F<CR><LF>』

3. RPM Sentence (Revolutions)

0 1 2 3 4 5 6
 \$--RPM, a, x, x. x, x. x, a, *hh <CR><LF>

Field No.	Data form	Field name	Output data
0	\$--RPM	Header	『\$RCRPM』
1	a	Source	『E』 : Engine
2	x	Number of shaft	『0』 ~ 『3』 : 0 =single, center : Odd =starboard : Even =port
3	x. x	Speed	『-799.9』 ~ 『799.9』 : [rpm]
4	x. x	Propeller pitch	『』 : Null
5	a	Data status	『A』 : Valid 『V』 : Invalid
6	*hh	Checksum	『00』 ~ 『FF』 : Except '\$' and the one on and after '*'

※Transmitting interval : 1second

※In case of RPM response ASTERN 132.2 rpm. : 『\$RCRPM, E, 0, -132.2, , A*47<CR><LF>』

		74SS48959-61E

4. ALA Sentence (Alarm condition)

0 1 2 3 4 5 6 7 8 9
 \$--ALA, hhmmss.ss, aa, aa, xx, xxx, a, a, c--c *hh <CR><LF>

Field No.	Data form	Field name	Output data
0	\$--ALA	Header	『\$RCALA』
1	hhmmss.ss	Event time	『』 : Null
2	aa	System indicator	『PC』 : Propulsion control
3	aa	Sub-system indicator	『PC』 : Propulsion control With Field No.5 『001』 to 『009』 『OT』 : Others With Field No.5 『900』 to 『905』
4	xx	Number of units	『01』 ~ 『04』
5	xxx	Number of alarm source	With Field No.3 『PC』 『001』 : Start interlock 『002』 : Automatic shutdown 『003』 : Automatic slowdown 『004』 : Override 『005』 : Critical speed 『006』 : Not use(System power supply) 『007』 : Not use(CPP oil pressure) 『008』 : Not use(CPP oil temperature) 『009』 : Not use(Unit power supply) With Field No.3 『OT』 『900』 : Manual shutdown (*1) 『901』 : Slowdown request (*1) 『902』 : Wrong way (*1) 『903』 : Start air low pressure (*1) 『904』 : Shut down prewarning (*2) 『905』 : Slow down prewarning (*2)
6	a	Condition	『X』 : Alarm 『N』 : Normal
7	a	Acknowledge	『V』 : Not acknowledged
8	c--c	Description	『』 : Null
9	*hh	Checksum	『00』 ~ 『FF』 : Except '\$' and the one on and after '*'

※Transmitting timing : At the time of an alarm state change, or on every one minutes (Nabtesco original).

※In case of start interlock occurred. : 『\$RCALA, PC, PC, 01, 001, X, V, *63<CR><LF>』

*1 : Nabtesco original

*2 : IACS recommendation

		74SS48959-61E

5. ETL Sentence (Engine telegraph operation status)

0 1 2 3 4 5 6 7
 \$--ETL, hhmmss.ss, a, xx, xx, a, x *hh <CR><LF>

Field No.	Data form	Field name	Output data
0	\$--ETL	Header	『\$RCETL』
1	hhmmss.ss	Event time	『』 : Null
2	a	Command	『O』 : Order 『A』 : Answerback
3	xx	Position indicator of telegraph	『00』 : STOP 『01』 : AH DEAD SLOW 『02』 : AH SLOW 『03』 : AH HALF 『04』 : AH FULL 『05』 : AH NAV. FULL 『11』 : AS DEAD SLOW 『12』 : AS SLOW 『13』 : AS HALF 『14』 : AS FULL 『15』 : AS CRASH ASTERN / EMERG. FULL, etc. (*4)
4	xx	Position indicator of sub-telegraph	『20』 : S/B (Stand-by engine) 『30』 : R/U (Run up) (Working, At sea, etc.) 『40』 : F/E (Finish with engine) 『50』 : T/E (Try engine) (*4)
5	a	Operating location	『B』 : Bridge 『P』 : Port wing (*3) (*4) 『S』 : Starboard wing (*3) (*4) 『C』 : Engine control room 『E』 : Engine side / local 『W』 : Wing (*3) (*4)
6	x	Number of shaft	『0』 ~ 『1』 : 0 =single, center : Odd =starboard : Even =port
7	*hh	Checksum	『00』 ~ 『FF』 : Except '\$' and the one on and after '*'

※Transmitting timing : On every the event occurrence or on every 1 minutes.

※By the bridge operation under bridge control, in case of MAIN AH SLOW order. :

『\$RCETL, , A, 02, 30, B, 0*70<CR><LF>』

※By the bridge operation, in case of SUB S/B order. :

『\$RCETL, , 0, 02, 20, B, 0*71<CR><LF>』

※By the engine control room operation under engine control room control, in case of MAIN AS FULL Answerback. :

『\$RCETL, , A, 14, 30, C, 0*78<CR><LF>』

*3 Output data of wing control depends on specification of each vessel.

Type A: Output "W" for both wing control condition.

Type B: Output "P" and "S" respectively.

*4 Application depends on project. Refer to the specifications for the project.

		74SS48959-61E

Sample of the engine telegraph operation and Sentence

During bridge control

Procedure NO.	Telegraph position		Output to VDR "ETL"		Note
	B/R trans.		Sentence	Meaning	
0	STOP		-----		
1	D. SL. AH		\$RCETL, , A, 01, 20, B, 0*hh	D. SL. AH "ANSWER"	B/R Order
2	SL AH		\$RCETL, , A, 02, 20, B, 0*hh	SL. AH "ANSWER"	

During ECR control

Procedure NO.	Telegraph position		Output to VDR "ETL"		Note
	B/R trans.	ECR receiv.	Sentence	Meaning	
0	STOP	STOP	-----		
1	D. SL. AH	↓	\$RCETL, , 0, 01, 20, C, 0*hh	D. SL. AH "ORDER"	B/R Order
2	↓	D. SL. AH	\$RCETL, , A, 01, 20, C, 0*hh	D. SL. AH "ANSWER"	
3	SL AH	↓	\$RCETL, , 0, 02, 20, C, 0*hh	SL. AH "ORDER"	
4	↓	SL AH	\$RCETL, , A, 02, 20, C, 0*hh	SL. AH "ANSWER"	
10	STOP	STOP	-----		
11	↓	D. SL. AH	\$RCETL, , 0, 00, 20, C, 0*hh	STOP "ORDER"	ECR Order
12	D. SL. AH	↓	\$RCETL, , A, 01, 20, C, 0*hh	D. SL. AH "ANSWER"	
13	↓	SL AH	\$RCETL, , 0, 01, 20, C, 0*hh	D. SL. AH "ORDER"	
14	SL AH	↓	\$RCETL, , A, 02, 20, C, 0*hh	SL. AH "ANSWER"	

During engine side/local control

Procedure NO.	Telegraph position		Output to VDR "ETL"		Note
	B/R trans.	Local receiv.	Sentence	Meaning	
0	STOP	STOP	-----		
1	D. SL. AH	↓	\$RCETL, , 0, 01, 20, E, 0*hh	D. SL. AH "ORDER"	B/R Order
2	↓	D. SL. AH	\$RCETL, , A, 01, 20, E, 0*hh	D. SL. AH "ANSWER"	
3	SL AH	↓	\$RCETL, , 0, 02, 20, E, 0*hh	SL. AH "ORDER"	
4	↓	SL AH	\$RCETL, , A, 02, 20, E, 0*hh	SL. AH "ANSWER"	
10	STOP	STOP	-----		
11	↓	D. SL. AH	\$RCETL, , 0, 00, 20, E, 0*hh	STOP "ORDER"	LOCAL Order
12	D. SL. AH	↓	\$RCETL, , A, 01, 20, E, 0*hh	D. SL. AH "ANSWER"	
13	↓	SL AH	\$RCETL, , 0, 01, 20, E, 0*hh	D. SL. AH "ORDER"	
14	SL AH	↓	\$RCETL, , A, 02, 20, E, 0*hh	SL. AH "ANSWER"	

Note : SUB Telegraph Position is Stand By

Note : Procedure NO.0-4 is when the transmitter in B/R is operated firstly, which is usual operation. Procedure NO.10-14 is when the receiver in ECR or Local is operated firstly, which is not usual operation.

There is no regulations under which a transmitter and a receiver are classified in IEC 61162-1 2010, so since putting it in procedure NO.10-14, the transmitter is operated with "Order" and the receiver is operated with "Answer".

Communication protocol of MASTER CLOCK

IEC 61162-1

Nabtesco Corporation

Marine Control Systems Company
Engineering Dept.

c	セ ZH:2/ 注記追加スル	C	2016 6/2	M. G.	-	榊原	竹下
b	セ ZH:2/ logger 用ヲ併記トスル	C	2015 6/9	R. M	小川	榊原	竹下
a	セ ZH: 現状ニ合ワセ見直ス	C	2012 8/8	TS	-	榊原	松尾
—	.		2009 6/3	畠山	-	堀本	竹下
REV. MARK	NOTE		DATE	DESIGNED	CHK.	APVD.	

		74SS49103-01E

1. General

A serial communication signal for MASTER CLOCK are inputted from the RS422 interface of telegraph logger or interface panel for master clock in the communication setting of table 1.

There are the input sentences shown in table 2 that are based on IEC61162.

Master clock send it every 1-3 second(s) according to master clock maker specification.

Method	Asynchronous
Data bits	8
Stop bits	1
Parity	None
Baud rate	4800bps
Characters	ASCII

Table 1 Communication setting

2. Sentence

0 1 2 3 4 5 6 7
 \$--ZDA, hhmmss.ss, xx, xx, xxxx, -xx, xx *hh <CR><LF>

Field No.	Data form	Field name	lutput data
0	\$--ZDA	Header	『\$ZQZDA』
1	hhmmss.ss	UTC	『000000.00』 ~ 『235959.99』
2	xx	Day (UTC)	『01』 ~ 『31』
3	xx	Month (UTC)	『01』 ~ 『12』
4	xxxx	Year (UTC)	『2009』 ~
5	-xx	Local zone hours (※1)	『00』 ~ 『±13』
6	xx	Local zone minutes (※1)	『00』 ~ 『59』
7	*hh	Checksum	『00』 ~ 『FF』 : Except '\$' and the one on and after '**

Table 2 Communication Sentences



※1 Local time zone is the magnitude of hours plus the magnitude of minutes added, with the sign of local zone hours, to local time to obtain UTC. Local zone is negative for East longitudes with local exceptions near the international date line.

Example: 『\$ZQZDA,234500.00,09,06,1995,-12,45*5E<CR><LF>』

This input indicates that local time is advancing 12H45M from "UTC 1995, June 9th 23H45M".

Instruction Manual for MT-800-VII Engine Telegraph System (Maneuvering Handle type)

The contents

	Page
1. Outline.....	2
2. Mechanical function of handle type telegraph.....	2
3. Maintenance.....	4
4. Explanation of each card.....	4
5. Explanation of error cord.....	8
6. The troubleshooting.....	9

Nabtesco Corporation **MARINE CONTROL SYSTEMS COMPANY**

		-	2023 03/14	TM	—	田高田	田中
REV. MARK	NOTE		DATE	DESIGNED	CHK.	APVD.	

1. Outline

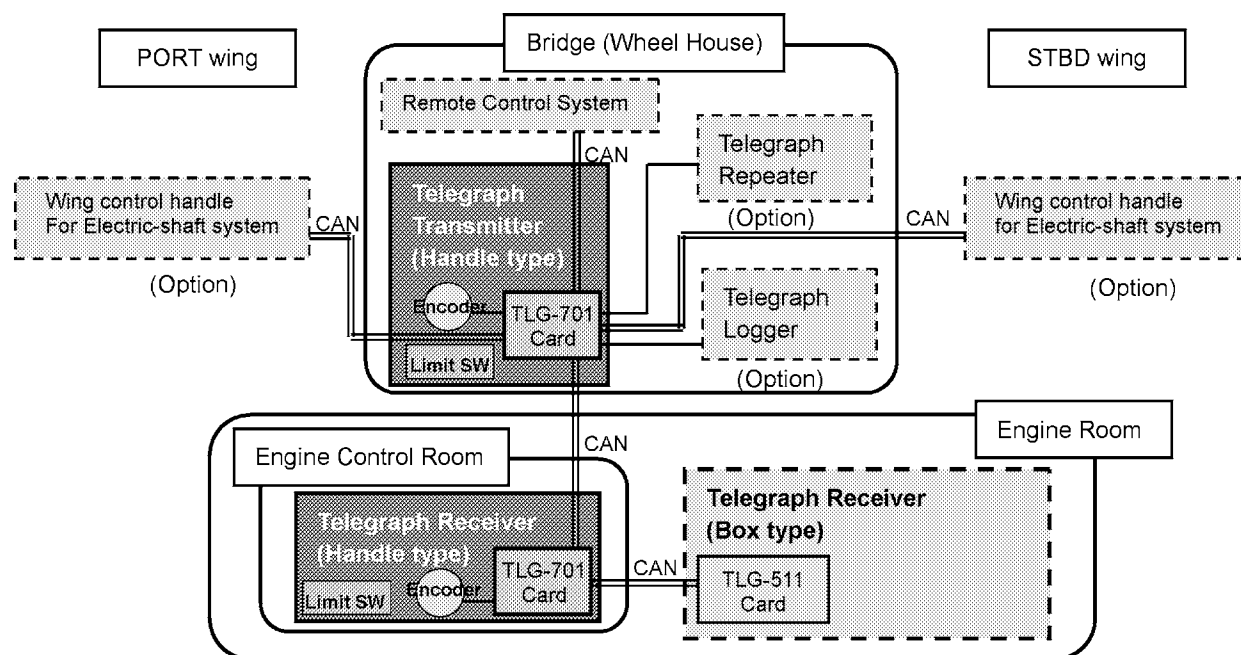


Fig. 1. System Construction

MT-800-VII telegraph system is used for ordering and replying between the bridge and the engine room (mainly engine control room). A transmitter is positioned on the bridge and receivers are positioned on the engine control room and local side of main engine. The transmitter and receivers have PCB card and they are connected by CAN communication line. A telegraph repeater and a telegraph logger can be connected to the transmitter as optional equipment.

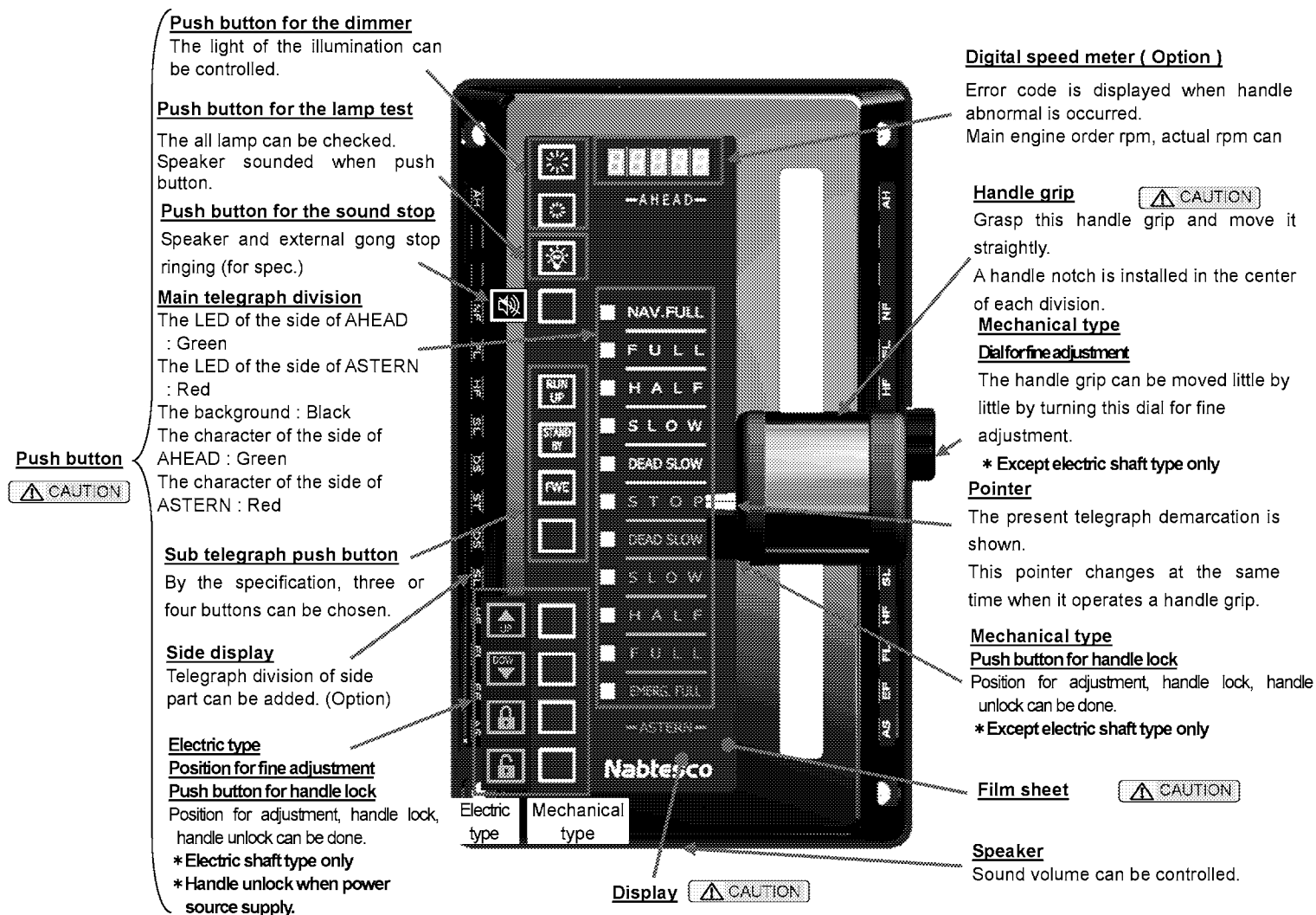
The handle type transmitter and receiver can also use as maneuvering handle of remote control system. If maneuvering from STBD or PORT wing is required, the electric shaft system makes it possible (See Fig. 1).

This manual describes about handle type transmitter and receiver. About the operation for telegraph function programed for each project, please refer to the instruction for remote control system.

2. Mechanical function of handle type telegraph

The handle is designed as a linear movement type. This handle has a dial for fine adjustment. And the handle grip is not moved due to vibration in any position. As the pointer moves together with the handle grip, operate the handle grip by observing the pointer.

The handle grip's linear movement is converted into a rotational movement by a mechanism to operate a rotary encoder for the telegraph system and the encoder and limit switches for the remote control system. The handle position detecting limit switches are independent from the telegraph and wired to the connectors for remote control. The encoders for remote control and telegraph are wired to the main card. A digital speed meter can also be built in.



Push button



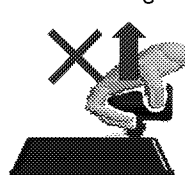
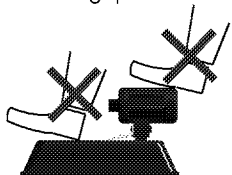
- Push buttons operate with a light force
If it does not work under normal force, do not force it and contact Nabtesco.
(There is a risk of damage if a force of 30 N or more is applied.)

Handle grip

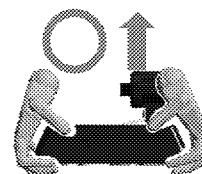
Film sheet



- Do not step on film sheet and handle grip. Also, do not carry handle that holding handle grip. There is a risk of damage.



Do not carry handle that holding handle grip.



Display



- Do not use the device (walkie-talkie, etc.) that emits strong radio waves near the display.
it may cause the display blackout. Use the device away from the display.

Film sheet



- When cleaning the film sheet, first remove any hard foreign matter, and then use a non-scratchable sheet such as an eyeglass cleaner to clean it.

3. Maintenance

Please maintain this handle according to the following period.

- Main CPU Card (TLG-701):every 10 years
- Terminal Board Card(TLG-702):every 10 years
- Side Display Card(TLG-703)(Option): every 10 years
- Limit Switch Card(TLG-705): every 10 years
- Motor(Electric shaft type only): every 10 years
- Potentiometer(Option): every 5 years

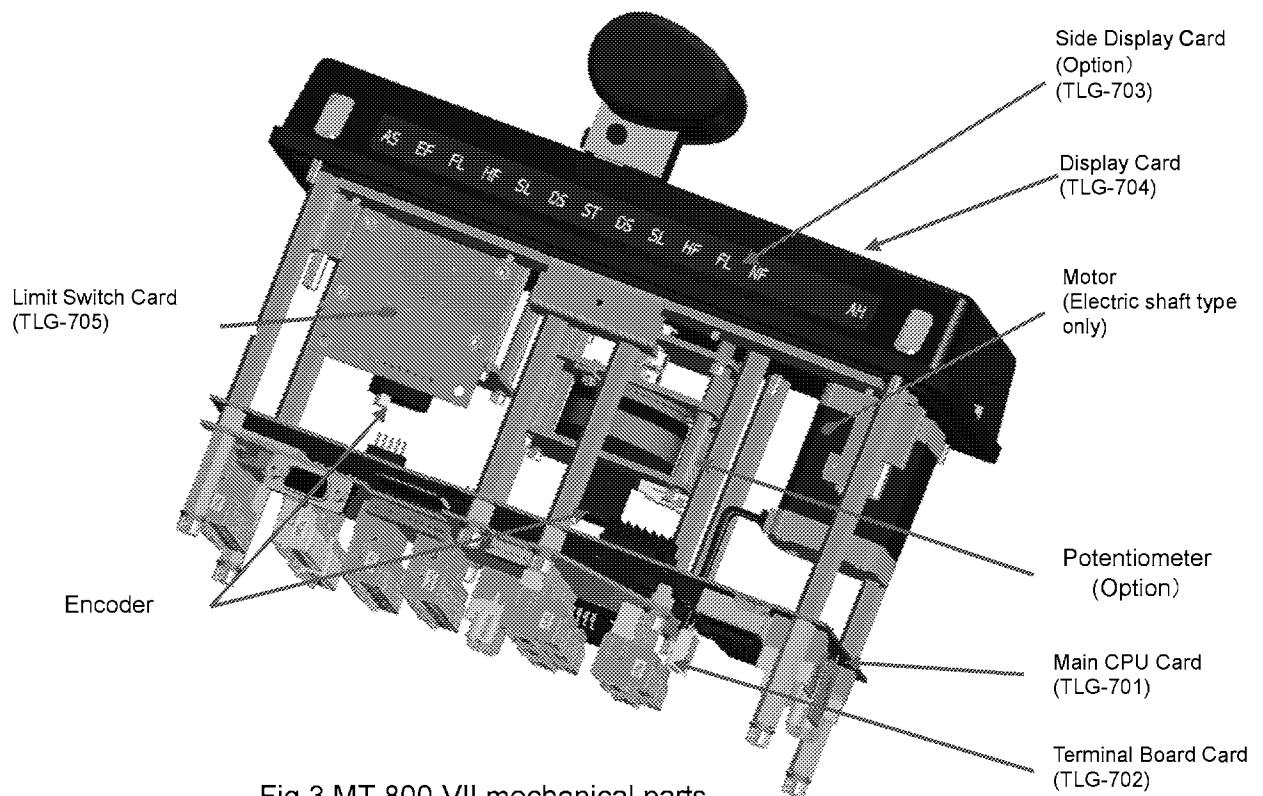


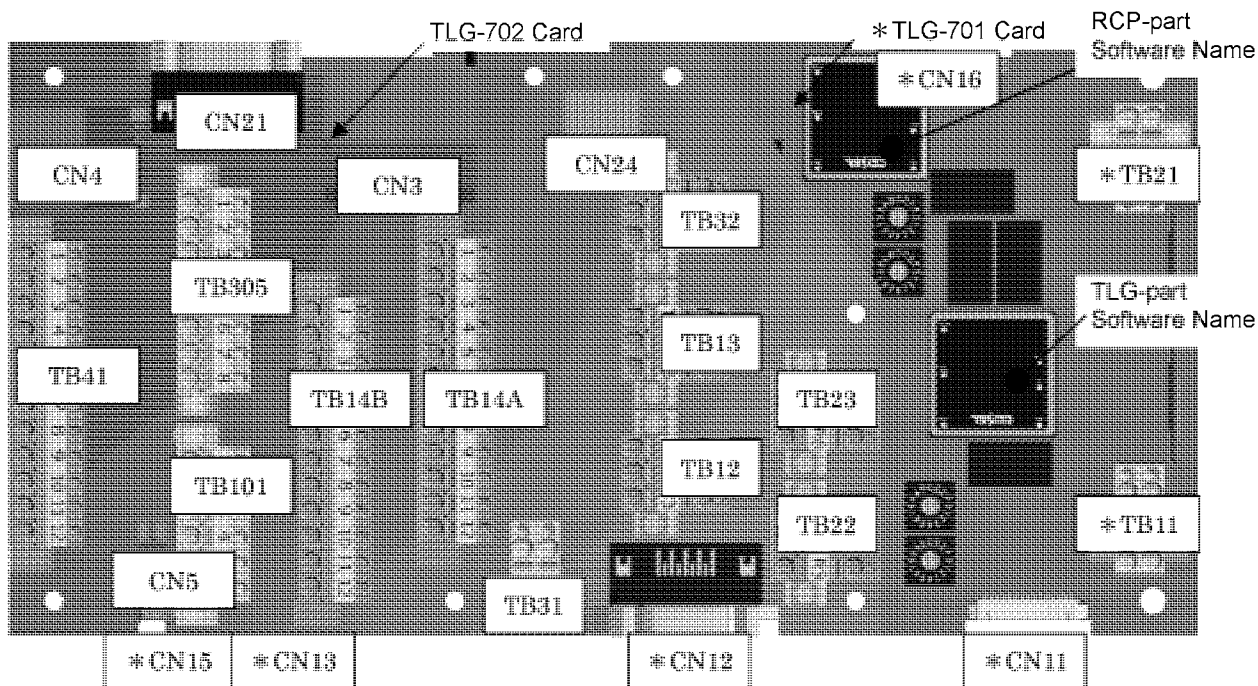
Fig.3.MT-800-VII mechanical parts

4. Explanation of each card

4-1. TLG-701 CARD (Main CPU Card)

- TLG-701 Card can be divided broadly into two part; TLG-part and RCP-part.
 TLG-part : Telegraph control part
 RCP-part : Encoder for remote control system (REMOCON) control part
- TLG-part is supplied with telegraph power source and RCP-part with REMOCON and Motor(Option) power source.
- TLG and RCP parts have 2-ch (Main and Sub) CAN communications respectively.
- TLG and RCP parts are written with a different software respectively

4-2. TLG-701(Main CPU Card), TLG-702(Terminal Board Card) Except Single Teleg.



【Terminal board / Connector】

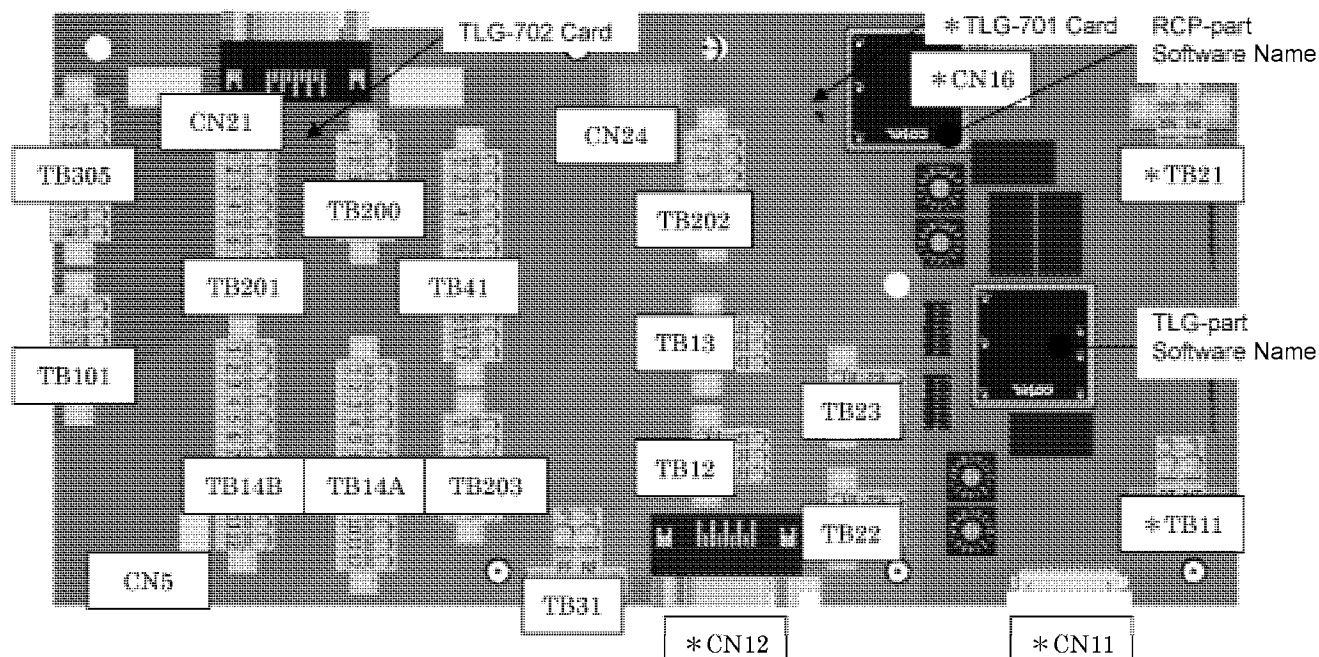
- * TB11 : Power source for telegraph
- TB12 : CAN1 for telegraph
- TB13 : CAN2 for telegraph
- TB14 : Various I/O
- *TB21 : Power source for REMOCON
- TB22 : CAN1 for REMOCON
- TB23 : CAN2 for REMOCON
- **TB31 : Power source for Motor
- CN3 : TLG-705 connecting
- CN4 : Potentiometer connecting
- CN5 : Speaker connecting
- *CN11 : TLG-704 connecting
- *CN12 : TLG-704 connecting
- *CN13 : TLG-704 connecting
- *CN15 : TLG-703(Left) connecting
- *CN16 : TLG-703(Right) connecting
- TB305 : Potentiometer Sig.
- TB101 : Repeater Output(Optional)
- TB41 : Limit Switch Sig.
- CN11 : Service maintenance port for TLG-part
- CN21 : Service maintenance port for RCP-part
- **CN24 : Motor connecting

- TB14-A1 : VDR sending (H)
- TB14-A2 : VDR sending (L)
- TB14-A4 : Repeater sending (H)
- TB14-A5 : Repeater sending (L)
- TB14-A7 : Abnormal output (+)
- TB14-A8 : Abnormal output (-)
- TB14-B1 : Logger output (H)
- TB14-B2 : Logger output (L)
- TB14-B4 : Buzzer source (+)
- TB14-B5 : Buzzer output
- TB14-B6 : Buzzer source (-)
- TB14-B7 : Limit switch STOP input (+)
- TB14-B8 : Limit switch STOP input (-)

* Mounted on TLG-701 Card

* * There is not connector in case of Motor not apply. (Except electric shaft type)

4-3. TLG-701(Main CPU Card), TLG-702(Terminal Board Card) Single Teleg.



【Terminal board / Connector】

- * TB11 : Power source for telegraph
 - TB12 : CAN1 for telegraph
 - TB13 : CAN2 for telegraph
 - TB14 : Various I/O
 - *TB21 : Power source for REMOCON
 - TB22 : CAN1 for REMOCON
 - TB23 : CAN2 for REMOCON
 - **TB31 : Power source for Motor
 - CN3 : TLG-705 connecting
 - CN4 : Potentiometer connecting
 - CN5 : Speaker connecting
 - *CN11 : TLG-704 connecting
 - *CN12 : TLG-704 connecting
 - *CN13 : TLG-704 connecting
 - *CN15 : TLG-703(Left) connecting
 - *CN16 : TLG-703(Right) connecting
 - TB305 : Potentiometer Sig.
 - TB101 : Repeater Output(Optional)
 - CN11 : Service maintenance port for TLG-part
 - CN21 : Service maintenance port for RCP-part
 - **CN24 : Motor connecting
 - TB41 : Limit Switch Sig.
 - TB200 : General purpose output
 - TB201 : General purpose input
 - TB202 : I/O connecting (Option)
 - TB203 : Relay output(F/E etc)
 - * Mounted on TLG-701 Card
 - * * There is not connector in case of Motor not apply. (Except electric shaft type)
- TB14-A1 : VDR sending (H)
 - TB14-A2 : VDR sending (L)
 - TB14-A4 : Repeater sending (H)
 - TB14-A5 : Repeater sending (L)
 - TB14-A7 : Abnormal output (+)
 - TB14-A8 : Abnormal output (-)
 - TB14-B1 : Logger output (H)
 - TB14-B2 : Logger output (L)
 - TB14-B4 : Buzzer source (+)
 - TB14-B5 : Buzzer output
 - TB14-B6 : Buzzer source (-)
 - TB14-B7 : Limit switch STOP input (+)
 - TB14-B8 : Limit switch STOP input (-)

4-4. TLG-703 CARD (Side Display Card)

- Mounted LED on each division.
- The handle position division LED appears.

4-5. TLG-704 CARD (Display Card)

- Main Telegraph division LEDs and 7-segment LEDs for Revolution Indication.
- Displayed the error code in digital part when occurred the telegraph system abnormal.(Standard function)

4-6. TLG-705 CARD (Limit Switch Card)

- Mounted 5 limit switch standard, additionally possible to mounted maximum 7 limit switch.

5. Explanation of error cord

5-1. How to confirm error code

Bright and Dark push switch shown in Fig.5.1, then displayed error code in digital part.

Operation manual refer to Fig 5.1.

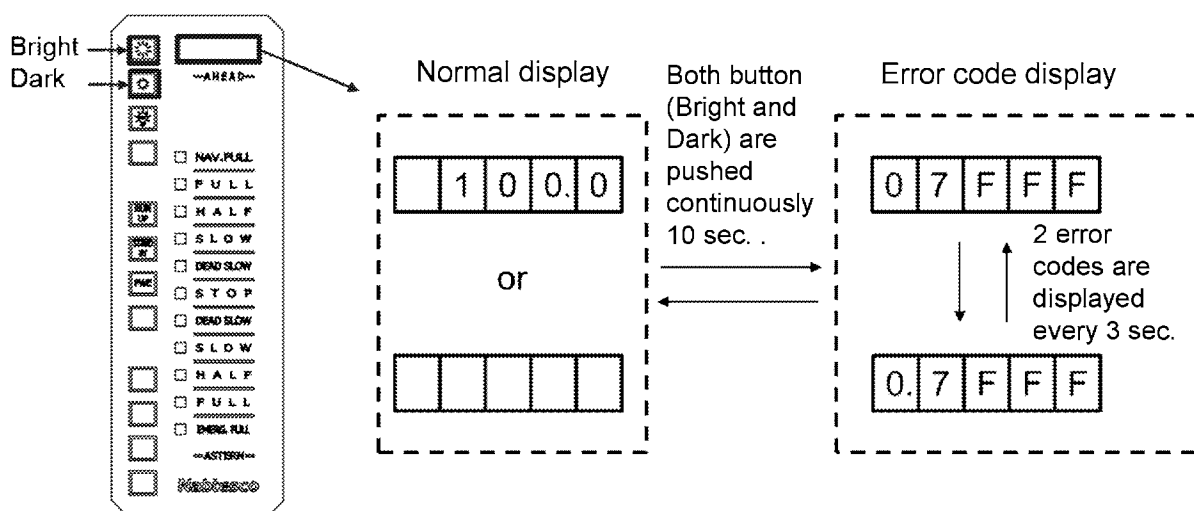


Fig.5.1 Error code display

Display Fig.5.2 in case of normal condition.

※Telegraph system abnormal is occur in case of displayed the number except Fig.5.2.
Attached the number in the digital part display, Contact Nabtesco.

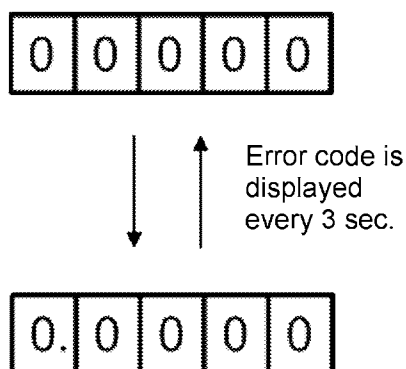


Fig.5.2 Error code (Normal condition)

6. The troubleshooting

If any of the following errors occur, please perform troubleshooting. Please refer to Chapter 5 for confirmation of the error code. If it is difficult to solve the problem, please inform Nabtesco of the abnormal situation and the error code.

6.1 The transmission order and/or reply divisions is/are not the same as the handle position.

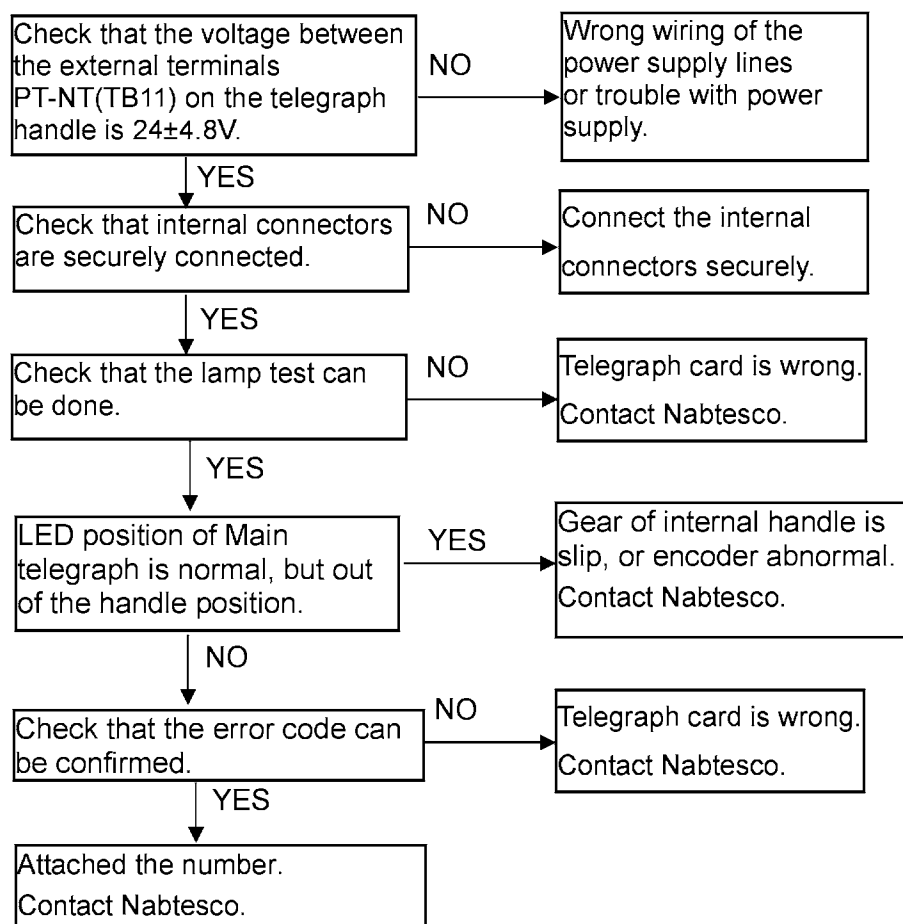


Fig.6.1. The transmission order and/or reply divisions is/are not the same as the handle position.

6.2 The display of the division LED disappears.

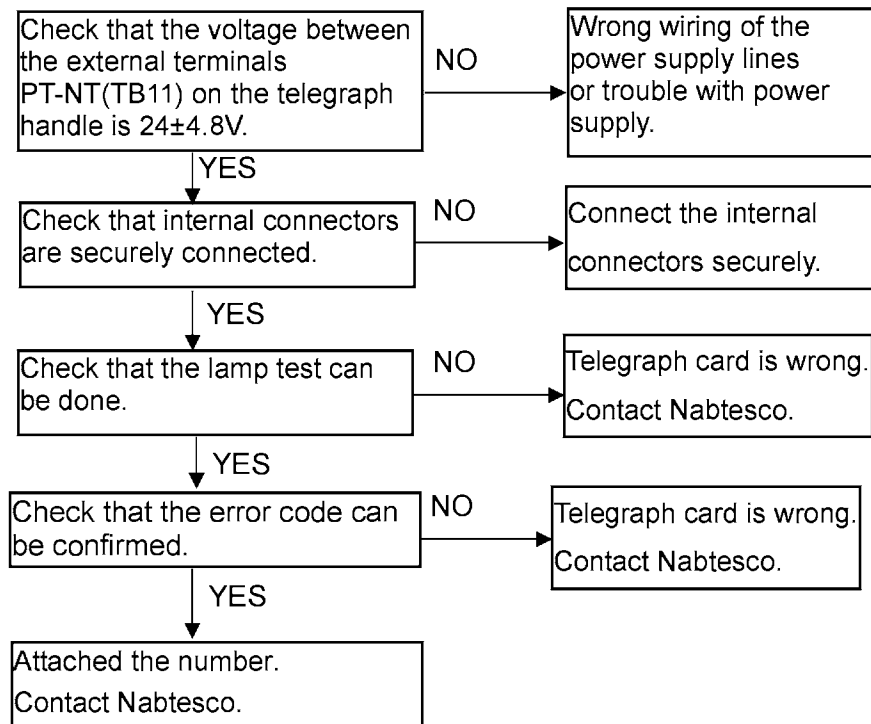


Fig.6.2. The display of the division LED disappears.

6.3 Gongs and buzzers are continuously sounded although the order and reply indication is good.

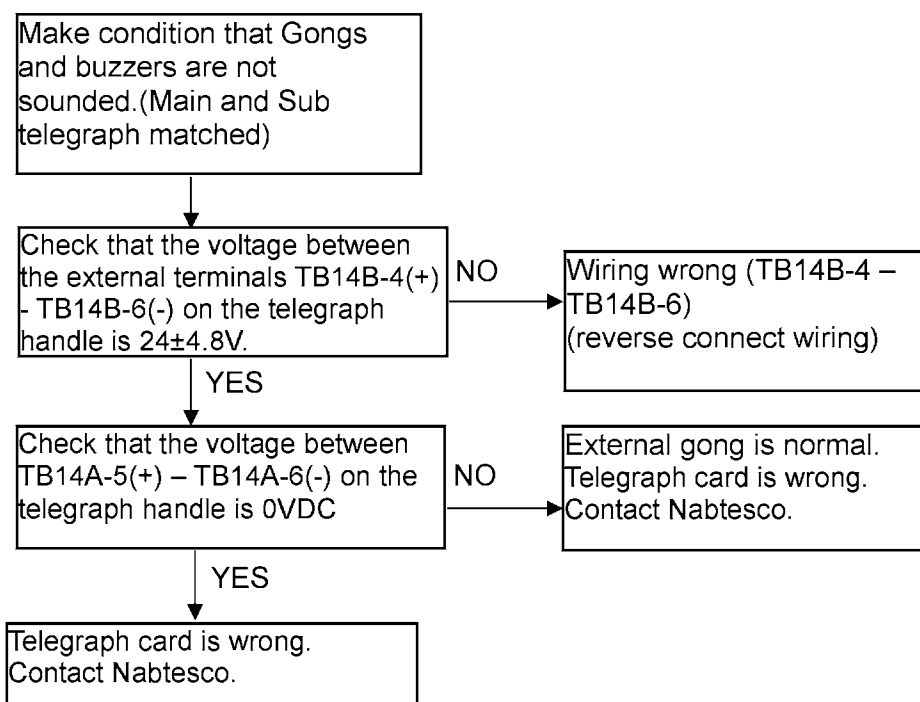


Fig.6.3. Gongs and buzzers are continuously sounded although the order and reply indication is good.

CIT-MR-0

ML-800-V-D TYPE

Telegraph Logger
Specifications**Nabtesco Corporation**MARINE CONTROL SYSTEMS COMPANY
ENGINEERING DEPARTMENT

a x 1	Added current consumption.	—	2023 03/28	H.Y	—	家根	田中広
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1. Overview

The telegraph logger monitors the positions of the telegraph transmitters and receivers in the main and sub telegraph systems; when there is any change in the transmitter positions, the newly placed telegraph position and the control position are printed out together with the current time.

As the receiver reply position agrees with the transmitter position, the division where the receiver has been placed and the control position are printed out together with the current time.

Furthermore, the actual M/E speed and the number of total revolutions are possible to be printed out as options. (The actual M/E speed can be printed out only when the telegraph logger is connected with Nabtesco telegraph system MT-800-V.)

2. Specifications



No.	Item	ML-800-V-D Type Specifications
1	Adaptable Telegraph Systems	Nabtesco telegraph systems (MT-800、MT-800-Ⅱ、MT-800-Ⅲ、MT-800-V)
2	Communications With Telegraph System	Serial signals (2-conductor), 4-bit parallel signals
3	Display	LCD dot matrix 8 characters x 2 lines
4	Operating Switch	Membrane seat switch
5	External I/O Terminal Block	Spring terminal block (connectable between 0.5 and 2.5 mm ²)
6	Outside Dimensions	W220xH240xD129.4
7	Weight	Approx. 4.2kg
8	Power Supply	DC24V±15%
8A	Current Consumption	Standby : Approx. 300mA Operation : Approx. 2.0A (※) ※ The current that flows for about 40msec when printing one line.
9	Operating Temperature Limit	0-40°C
10	Printing Method	Thermal line dot method
11	Winding Method	Automatic winding method
12	Digital Inputs	4 Current Consumption : DC24V Approx. 6mA per point
13	Analog Inputs	nothing
14	Abnormal Output	1 signal (normally open type): NPN open-collector output: Max. DC24V 70mA ON (closed) at CPU abnormality, telegraph communication error, printer error, master clock communication error, and data error of memory.
15	Adaptable Master clock	There are two methods. ① Serial communication • Two balanced wired system (RS-422) • Based on NMEA0183 ② 30-second polarized pulse signal input • Clock signal : DC24V Approx. 6mA • Counter-clockwise signal : DC24V Approx. 6mA

3. Operation

1) At Power-up

Five seconds after turning the power switch ON, the present positions of the main and sub telegraph transmitters and the control position at power-up are printed out together with mark "P" showing the power-up in 2 lines.

If no data are taken in because of communication error and so on, the error indication is printed out with "P" mark in 1 line.

2) Normal Operation

When there is any change in the main and sub telegraph transmitters or receivers, the transmitter new order or receiver reply position is printed out together with the control position and the date and time then.

The new transmitter and receiver positions can be detected when the signal has continued for 1 sec. or more.

Note: Under Bridge control, no reply is necessary to the main telegraph.

3) Test Print

Pressing TEST button causes the main and sub telegraph transmitter divisions to be printed out together with the control position, the date and time, and test print mark "T" in 2 lines.

Then, to keep pressing the button makes the test print continue.

4) Time Print

Pressing TIME button causes the only date and time shown on the time section to be printed out.

Then, to keep pressing the button makes the time print continue.

5) Paper Feed

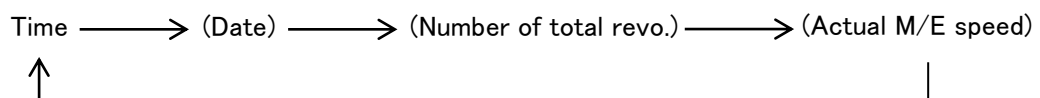
Pressing FEED button causes the paper to be fed by 1 line with no printing.

Then, to keep pressing the button feeds the paper continuously.

6) Display Switchover (*)

Press and release FEED button continuously while holding down FUNCTION button causes the display to show as follows: time → (date) → (the number of total revolutions) → (actual M/E speed).

However, the item in () is sometimes not displayed according to the specifications.

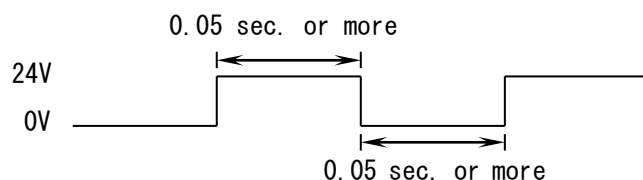


7) Printing the Number of Total Revolutions (*)

Connecting a revolution counter to the telegraph logger enables the number of total revolutions to be printed out. The telegraph logger input signal is produced by counting the revolution as (1 pulse / 1 revolution) or (1 pulse / 10 revolutions). (The maximum pulse input frequency is 10 Hz.)

The input pulse signal is to be 0.05 sec. or more for both ON and OFF duration.

The print timing is selectable between cases of "when the telegraph handle is set to STOP division" and "when the external print signal is inputted". The number of total revolutions is printed out in 8 digits.



8) Printing the Actual M/E Speed (*)

Connecting the telegraph system MT-800-V to the telegraph logger enables the actual M/E speed to be printed out. The actual M/E speed is printed out at each print time together with the control position and the date and time.

When it has settled, the actual M/E speed is printed out together with settling mark "#".

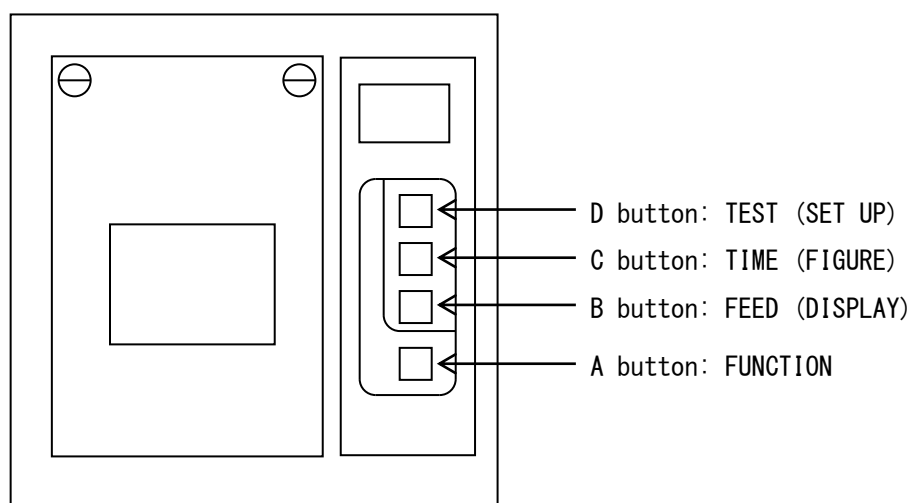
The settling conditions can be selectable from the following items:

Settling Print Conditions	
Setting 1	Not print
Setting 2	When M/E speed change becomes 3rpm within a minute after there was a change of 3rpm or more from the previously printed M/E speed.
Setting 3	When M/E speed change becomes 3rpm within 2 seconds after there was a change of 3rpm or more from the previously printed M/E speed.

Note: At M/E speed of 20rpm or below, the printing is carried out only when M/E speed is settled at 0rpm (M/E at a stop).

Addition of the (#) mark can be selectable.

The items appended with (*) become effective only when the optional function is added.



4. Receiving the Clock Data

Four different methods of receiving the clock data are as follows:

1) Receiving the Clock Data from Master Clock on Serial Communication

The clock data from the master clock are taken in on serial communication. In this case, there is no necessary to adjust the time and date on the telegraph logger side.

If there is communication error with the master clock, the error code is shown on LCD. (For details, see the troubleshooting 74SS49370-01E.)

When the communication with the master clock has been restored to normal, the indication returns to normal. On the occurrence of communication error, the clock data is taken in from the internal real-time clock. While the clock data is being taken from the internal real-time clock, the clock data is printed out such as "12:34:56?" with mark "?". When the backup battery for the internal real-time clock has run out because it has been turned off for a long time or the like, the logger prints "EE:EE:EE?".

2) Receiving Pulses from Master Clock

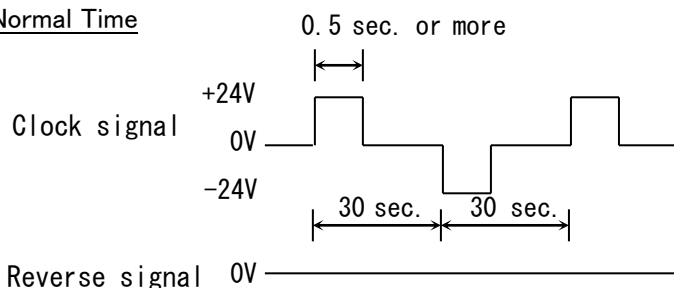
Taking in the pulses sent from the master clock at intervals of 30 seconds causes the time to advance. The second-digit is printed out as "00" for 0-29 seconds and "30" for 30-59 seconds, or "0" for 0-29 seconds and "5" for 30-59 seconds according to the specifications. After turning on the telegraph logger, it is necessary to adjust the time and date. When the time and date adjustment has not been completed or the master clock signal cannot be received, the clock data is taken in from the internal real-time clock. While the clock data is taken in from the internal real-time clock, the clock data is printed out such as "12:34:30?" with mark "?". When the backup battery for the internal real-time clock has run out because it has been turned off for a long time or the like, the logger prints "EE:EE:EE?".

Since there is a flickering indication of "Pls. SET" prompting to adjust the time and date on LCD, please make adjustment according to item 5.

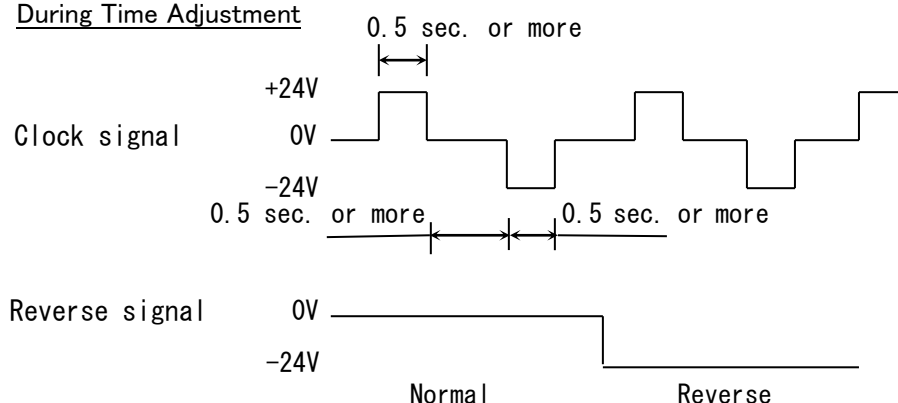
After completing the time and date adjustment, the indication becomes normal.

Input the clock and reversing signals as shown in the figure below.

Normal Time



During Time Adjustment



3) Receiving Data from Internal Real-Time Clock

The clock data is taken in from the internal real-time clock installed in the telegraph logger. After turning on the telegraph logger, it is necessary to adjust the time and date.

When the time and date adjustment has not been completed, the clock data is printed out such as "12:34:56?" with mark "?". When the backup battery for the internal real-time clock has run out because it has been turned off for a long time or the like, the logger prints "EE:EE:EE?".

Since there is a flickering indication of "Pls. SET" prompting to adjust the time and date on LCD, please adjust according to item 5.

After completing the time and date adjustment, the indication becomes normal.

4) Receiving Data Via Telegraph System

When the telegraph system takes in the clock data from the master clock, the logger system can take in the clock data via the telegraph system. In this case, there is no necessary to adjust the time and date on the telegraph logger side.

If there is a communication error with the telegraph system, LCD shows the error code. (For details, see the troubleshooting 74SS49370-01E.)

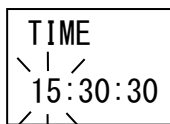
When the communication with the telegraph system has been restored to normal, the indication returns to normal. On the occurrence of communication error, the clock data is taken in from the internal real-time clock. While the clock data is being taken in from the internal real-time clock, the clock data is printed out such as "12:34:56?" with mark "?". When the backup battery for the internal real-time clock has run out because it has been turned off for a long time or the like, the logger prints "EE:EE:EE?".

5. Adjusting the Time and Date

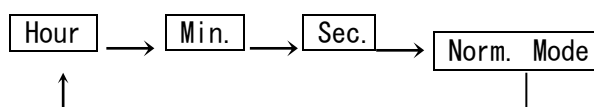
When the clock data receiving method is the Receiving Pulses from Master Clock (4-2)) or the Receiving Data from Internal Real-Time Clock (4-3)), it is necessary to adjust the time and date.

1) How To Adjust the Time

- ① Make LCD show the time.
See 3-6).



- ② Press TIME button while holding down FUNCTION button. Then, the time-digit flickers.
- ③ Then, press and release TIME button continuously while holding down FUNCTION button causes the flickering part to move as shown below. Since the flickering part is settable, select the part to be set by pressing TIME button while holding down FUNCTION button.



- ④ Every time TEST button is pressed while holding down FUNCTION button increases the value in the flickering part by 1. Pressing and holding TEST button enables the value to fast-forward.
- Since there is no carry of digit, adjust the value at each digit.

Note: In a case where the receiving method of clock data is to receive pulses from the master clock, the second-digit indication shows "00" and "30" alternately every time the button is pressed.

- ⑤ Repeat the operations ③ and ④ until the time becomes correct.
- ⑥ After completing the time adjustment, set the indication to normal mode by the operation ③ (the condition of no flickering digit), resulting in the completion of adjustment.

Indication Value:

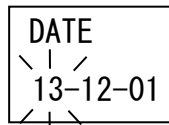
Hour-digit: 00-23

Minute-digit: 00-59

Second-digit: 00-59 (00 or 30)

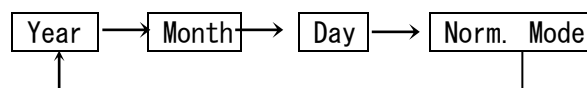
2) How To Adjust the Date

- ① Make LCD show the date.
See 3-6).



- ② First, press TIME button while holding down FUNCTION button. Then, the year-digit flickers.
- ③ After that, press and release TIME button continuously while holding down FUNCTION button causes the flickering part to move as shown below. Since the flickering part is settable, select the part to be set by pressing TIME button while holding down FUNCTION button.

Note: The sequence of Year, Month, and Day varies according to the telegraph specifications.



- ④ Every time TEST button is pressed while holding down FUNCTION button increases the value in the flickering part by 1. Pressing and holding TEST button enables the value to fast-forward. Since there is no carry of digit, adjust the value at each digit.
- ⑤ Repeat the operations ③ and ④ until the date becomes correct.
- ⑥ After completing the date adjustment, set the indication to normal mode by the operation ③ (the condition of no flickering digit), resulting in the completion of adjustment.

Indication Value:

Year-digit: 0-99

Month-digit: 0-12

Day-digit: 0-28 or -29 or -30 or -31

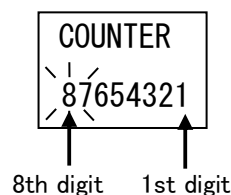
(according to the settings of Year-digit and Month-digit)

6. Adjusting the Revolution Counter

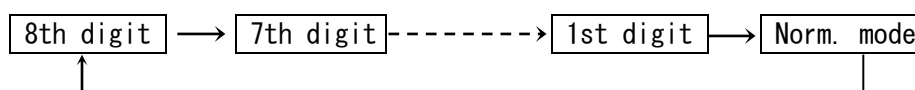
Before using the revolution counter, it is necessary to adjust the revolution counter.

1) Adjusting the Revolution Counter

- ① Make LCD show the revolution counter.
See 3-6).



- ② First, press TIME button while holding down FUNCTION button.
Then, 8th digit flickers.
- ③ After that, press TIME button once while holding down FUNCTION button causes the flickering part to move as shown below. Since the flickering part is settable, select the part to be set by pressing TIME button while holding down FUNCTION button.



- ④ Every time TEST button is pressed while holding down FUNCTION button increases the value in the flickering part by 1. Pressing and holding TEST button enables the value to fast-forward. Since there is no carry of digit, adjust the value at each digit.
- ⑤ Repeat the operations ③ and ④ until the date becomes correct.
- ⑥ After completing the revolution counter adjustment, set the indication to normal mode by the operation ③ (the condition of no flickering digit), resulting in the completion of adjustment.

2) Resetting the Revolution Counter

Pressing TIME button and then TEST button at the same time, while holding down FUNCTION button causes the revolution counter to be reset.

Note: Even if the telegraph logger is turned off, the revolution counter's value can be maintained in the internal RAM for approximately 1 week. Since turning it off for more than 1 week causes the revolution counter to be reset, it is necessary to adjust the telegraph logger again.

7. Logger Abnormality Output

If any one of the following abnormalities occurs, LOGGER ABNORMAL signal is outputted.

(ON at the occurrence of logger abnormality.)

For the details of and measures against each abnormality, see the troubleshooting 74SS49370-01E.

LOGGER ABNORMAL output can drive a load up to DC24V, 70mA at the maximum via open-collector output with photocoupler. Use it as need arises.

No.	Factors of LOGGER ABNORMAL Output
1	Communication error with telegraph system.
2	Data error from telegraph system.
3	Communication error with master clock.
4	Data error from master clock.
5	Communication error with printer.
6	Printer cover open.
7	Out of paper.
8	Temperature abnormality of printer head.
9	Data Error of memory.
10	CPU abnormality.

8. Precautions

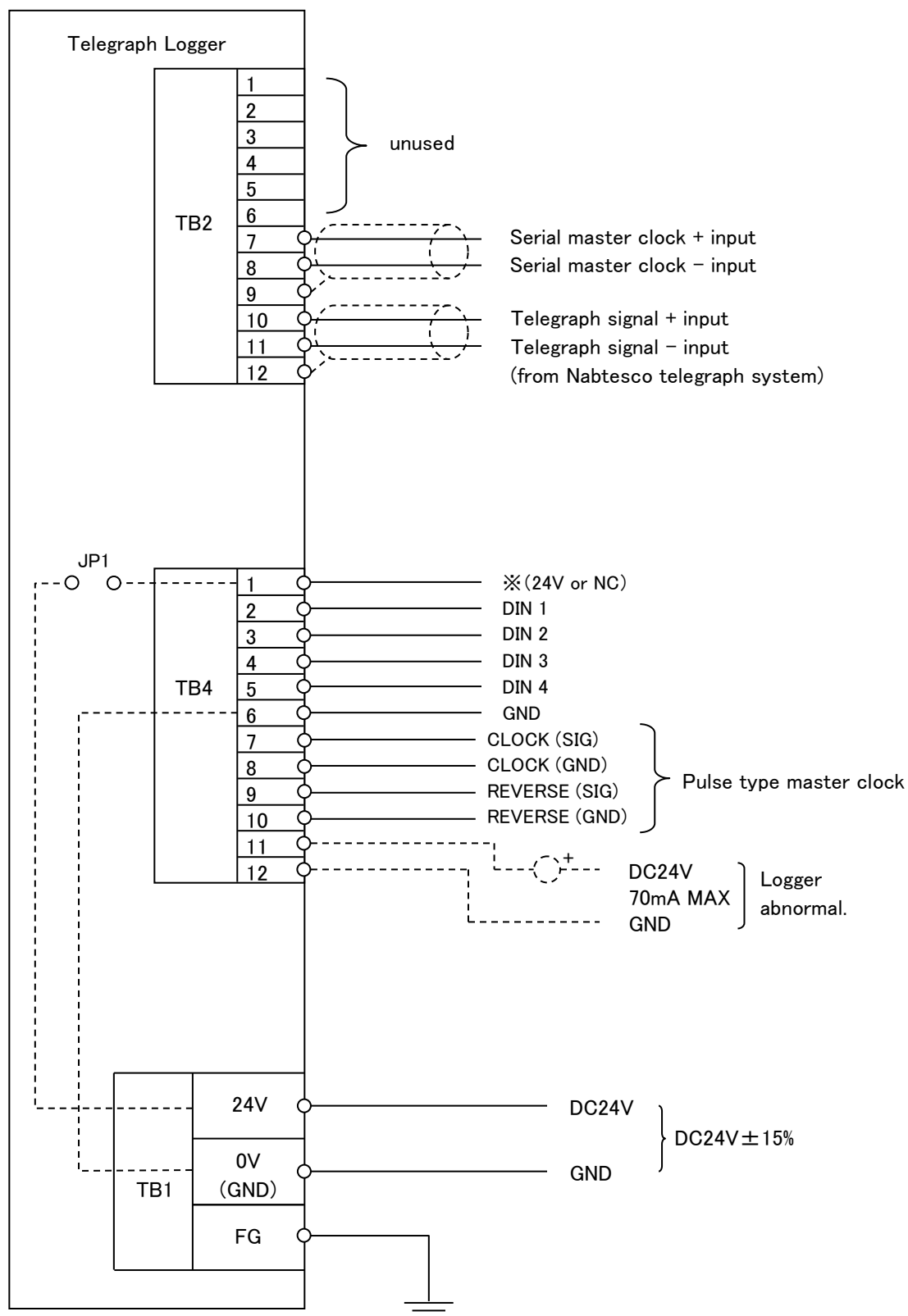
- (1) Do not touch the internal circuit boards and electric components; if not, the product could malfunction due to static electricity and so on.
In addition, leave an interval more than 30 sec. between turning off and succeeding turning on.
- (2) This product is designed to use thermal paper. When supplying the paper, use exclusive thermal paper.
Keep thermal paper away from high temperature and humidity.
For how to replace thermal paper, see how to replace printer paper (74SS49362-01E).
Order no. of thermal paper (Nabtesco): 74744800-01
- (3) When the quantity of paper becomes few (approx. 50cm), there is a red mark showing the end of paper on the right end of the paper.
Although the printing is possible even in this condition until paper end, replace the paper with new one as soon as possible.

9. Printing Characters Setting List

Setting	Sub Telegraph Divisions	Main Telegraph Divisions		
	Divisions equivalent to AT SEA	Divisions equivalent to N.FULL-AH	Divisions equivalent to STOP	Divisions equivalent to EMERG. FULL
1	AT SEA	N.FULL -AH	STOP	EMERG.FULL
2	RUN UP	FULL A -AH	NEUTRAL	E.FULL -AS
3	WORKING	RUNG UP	HOVERING	EM 'CY FULL
4	NAVIGATION	F.AWAY -AH		EM 'CY -AS
5	RUNG UP	NAV.		CRASH -AS
6	FULL UP	NAVIGATION		HARD FULL
7	RUNNING			FULL A -AS
8	FULL AWAY			
9				
10				

The setting of printing characters is determined according to the vessel specifications in the end. If there is no special designation, the printing characters of "Setting 1" are applied to the product.

10. Sample Wiring Diagram



※ TB4-1 is common for digital inputs. Switching between internal and external power sources can be done with jumper JP1. In the case of using the internal power source as common, apply JP1 and make TB4-1 NC (no connect). In the case of using the external power source as common, remove JP1 and apply external power source DC24V to TB4-1.

CIT-MR-0

NOTICE OF WIRING WORK
FOR
REMOTE CONTROL SYSTEM

Nabtesco Corporation

MARINE CONTROL SYSTEMS COMPANY
ENGINEERING DEPARTMENT

a x1	DZH:P.2 Revised the latest revision year	C	2022 10/21	Y.J	高杉	三木	竹下
—	For M800-VII M:74SS45190-05E (c)		2022 2/24	太田	-	T.S	榊原
REV. MARK	NOTE		DATE	DESIGNED	CHK.	APVD.	

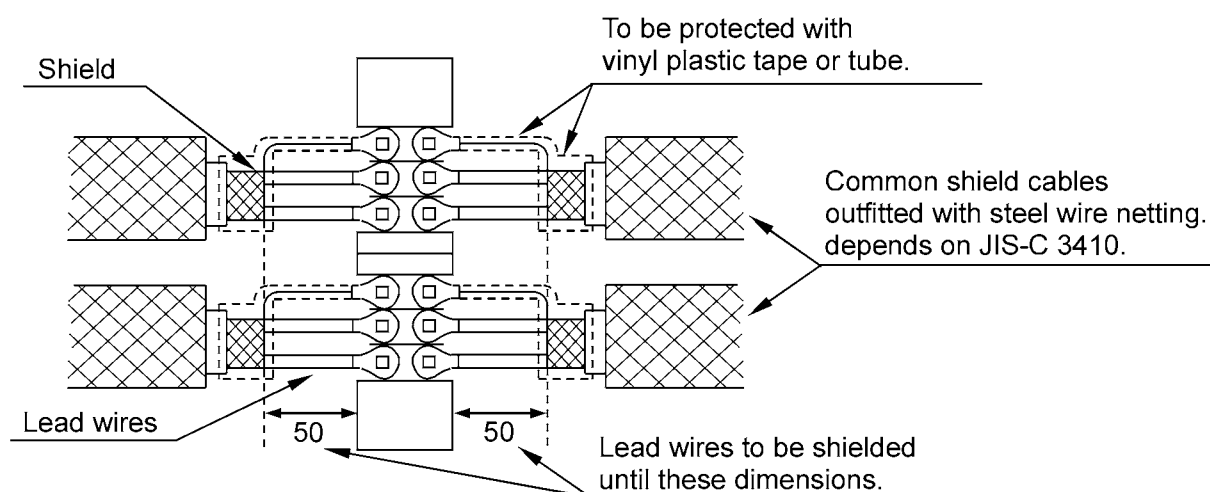
In wiring work for a bridge maneuvering system, a remote control system or the other control systems, the following notice should be followed.



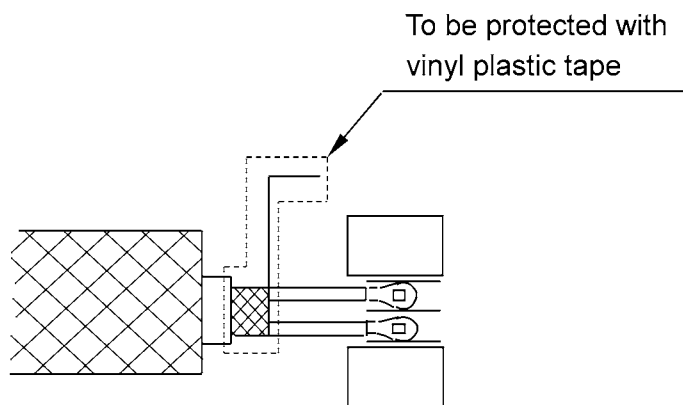
1. Marine use cables such as specified in JIS-C 3410 (2018) are to be used.
2. Multiple-cables are recommended to include about 10% spare.
3. System cables, especially shield cables, are recommended to be separated from AC power cables as far as possible in parallel wiring (recommended distance is more than 10 cm according to IEC 60533), and be crossed them if touched condition can not be avoided.
4. Wiring routes are to be followed the drawing of wiring diagram outline (INPUT / OUTPUT LIST) and to be planned as short as possible.
5. System cables are to be protected from damage by construction works such as welding or fitting work.
6. Regulated crimp terminals or stripped length of the connecting portion are to be kept for connecting wires to the terminal boards.
7. In wiring work of shield cables, the following notice is to be followed.

[Notice for wiring work of shield cables]

In case shield cables are specified in the circuit diagrams or the drawing of wiring diagram outline (INPUT / OUTPUT LIST), the specified shield cables are to be used, and the following notice is to be followed for protecting system stability and inside semiconductors from inductive-voltage or noise.



- 1) Shield is to be connected to the terminal board, treating same as ordinary wires.
- 2) Shield is to be grounded at one-point (two-point grounding should be avoided without fail).
- 3) Shield is to be protected with vinyl plastic tape or tube.
- 4) Shield cables are to be treated individually even there are plural shield cables for components such as F.O. rack transmitter, pulse generator or CPP follow up box etc
- 5) Unconnected shield is to be protected with vinyl plastic tape



8. The remaining wires in the INPUT OUTPUT LIST except the wires mentioned just before should be wired as shown below.

In addition, the connecting portion of the wire should be stripped and stranded in the indicated length below.

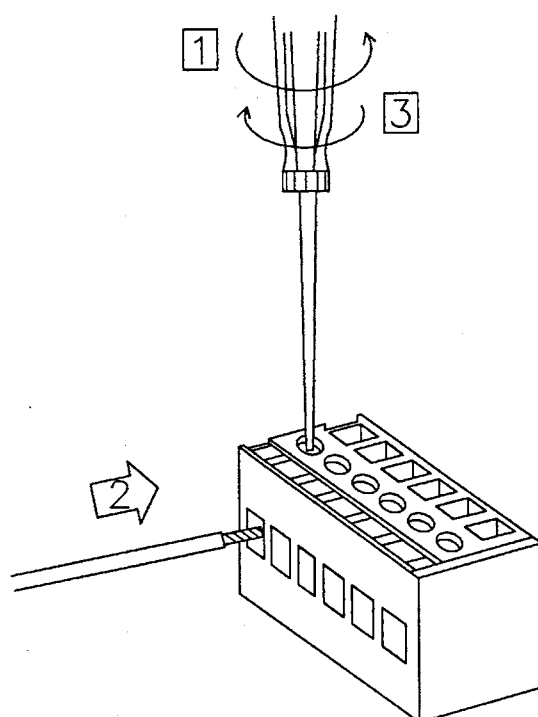
- ※ The stripped length of connecting portion should be according to wiring caution plate on each unit.

Additionally, wiring connection check is to be done as shown below.

FOR M-800-VII

POWER SOURCE UNIT

(Terminal No.A1,A2,BA1,BA2,BP,BN,CA1,CA2,CP and CN)

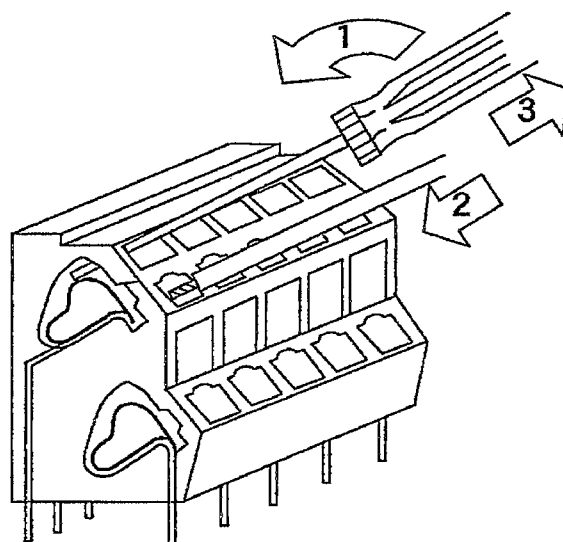


Stripped length of the connecting portion

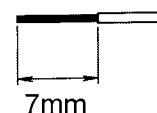


FOR M-800-VII

POWER SOURCE UNIT

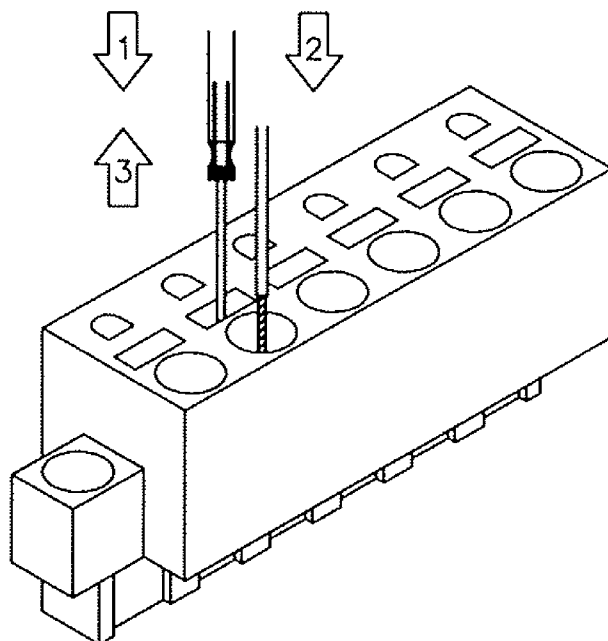


Stripped length of the connecting portion

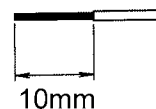


CIT-MR-0

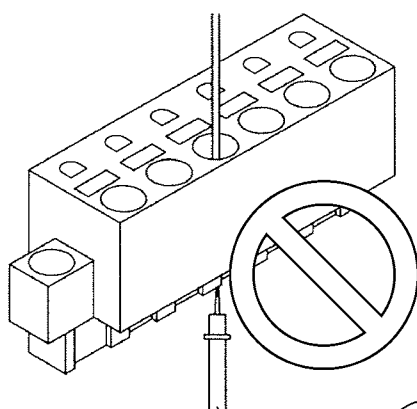
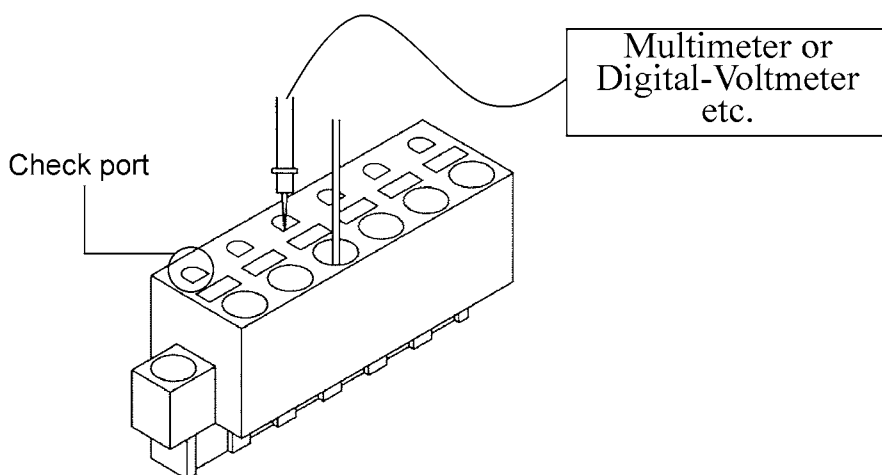
FOR M-800-VII
BDP UNIT, CDP UNIT, etc.



Stripped length of the
connecting portion



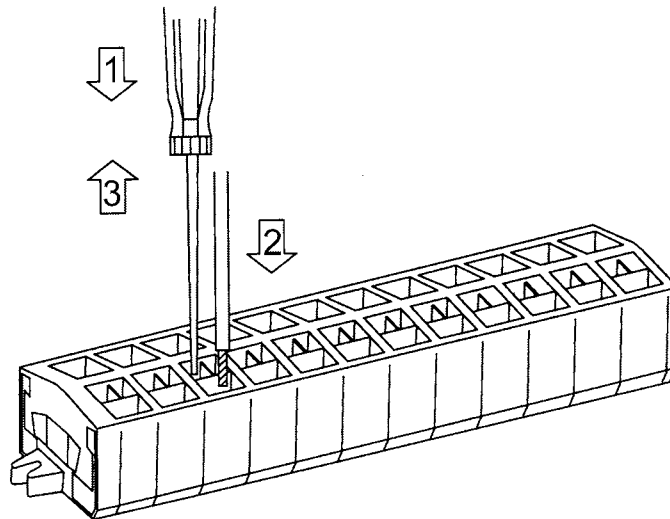
Wiring connection check should be done at check port of the connector.



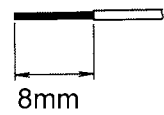
Do not check the connection at the
connector side as the contact of the
connector may be defective.

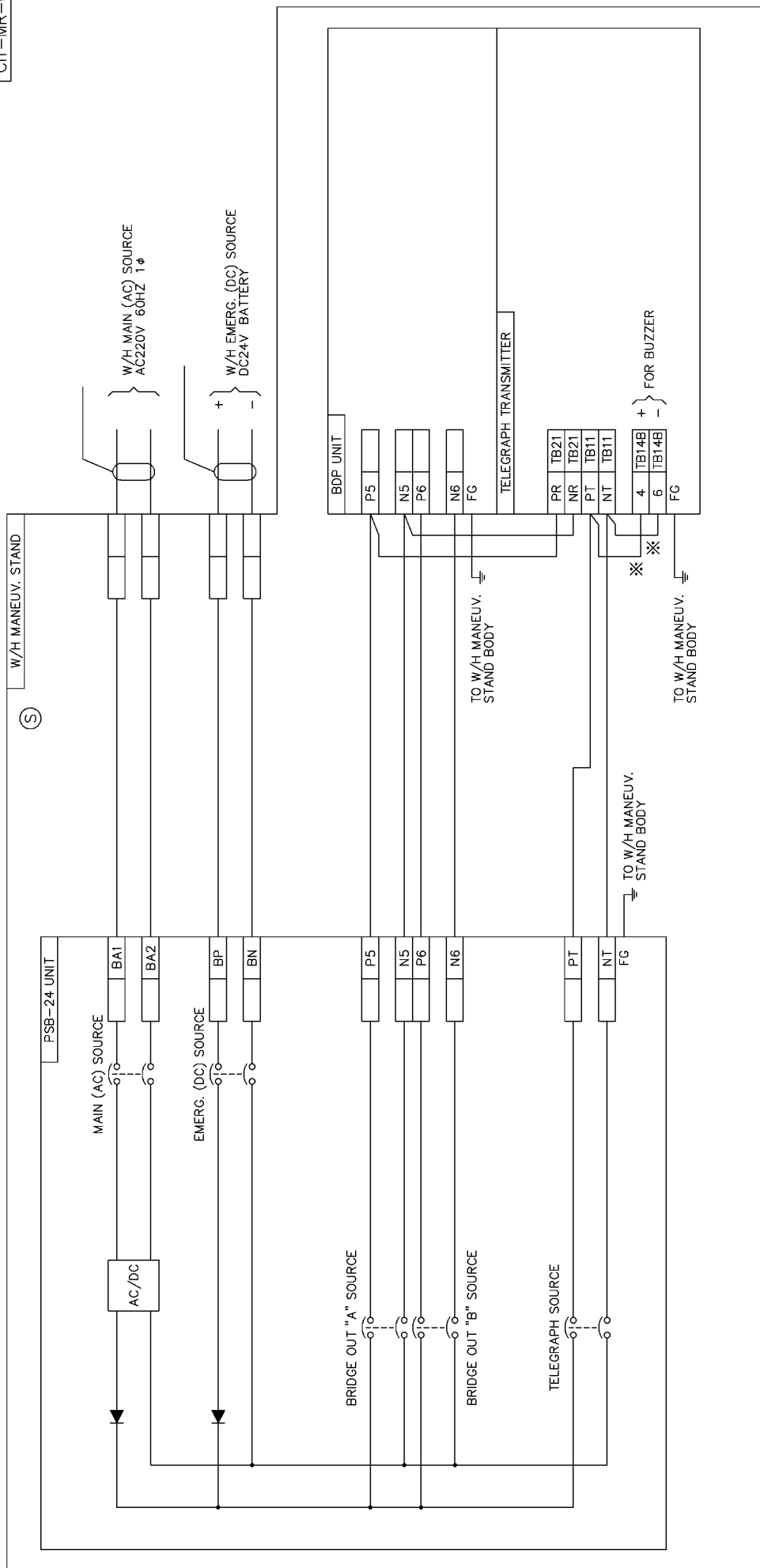
Multimeter or
Digital-Voltmeter
etc.

FOR M-800-VII
BRIDGE CONSOLE,
LOCAL SWITCH BOX, etc.



Stripped length of the
connecting portion

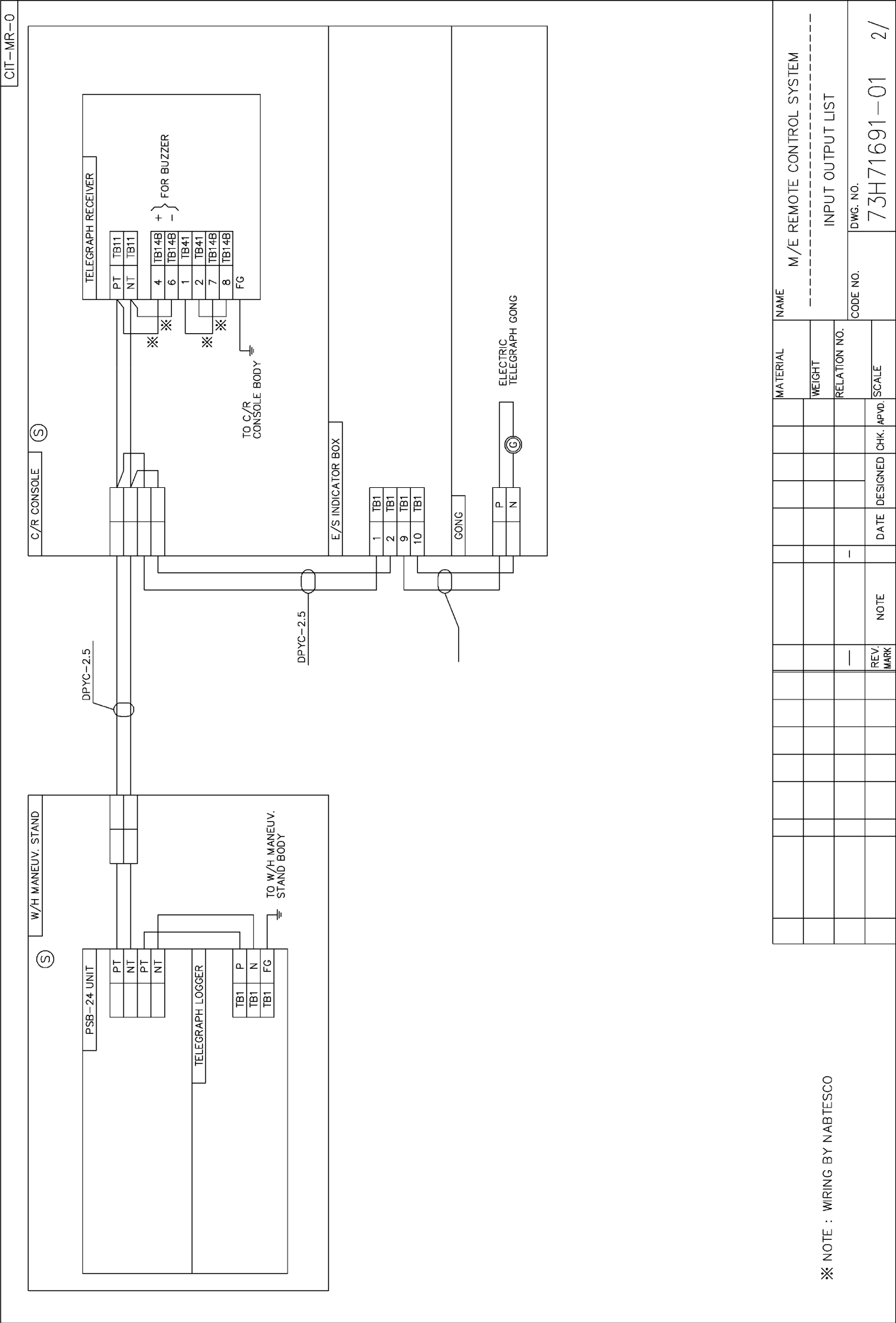


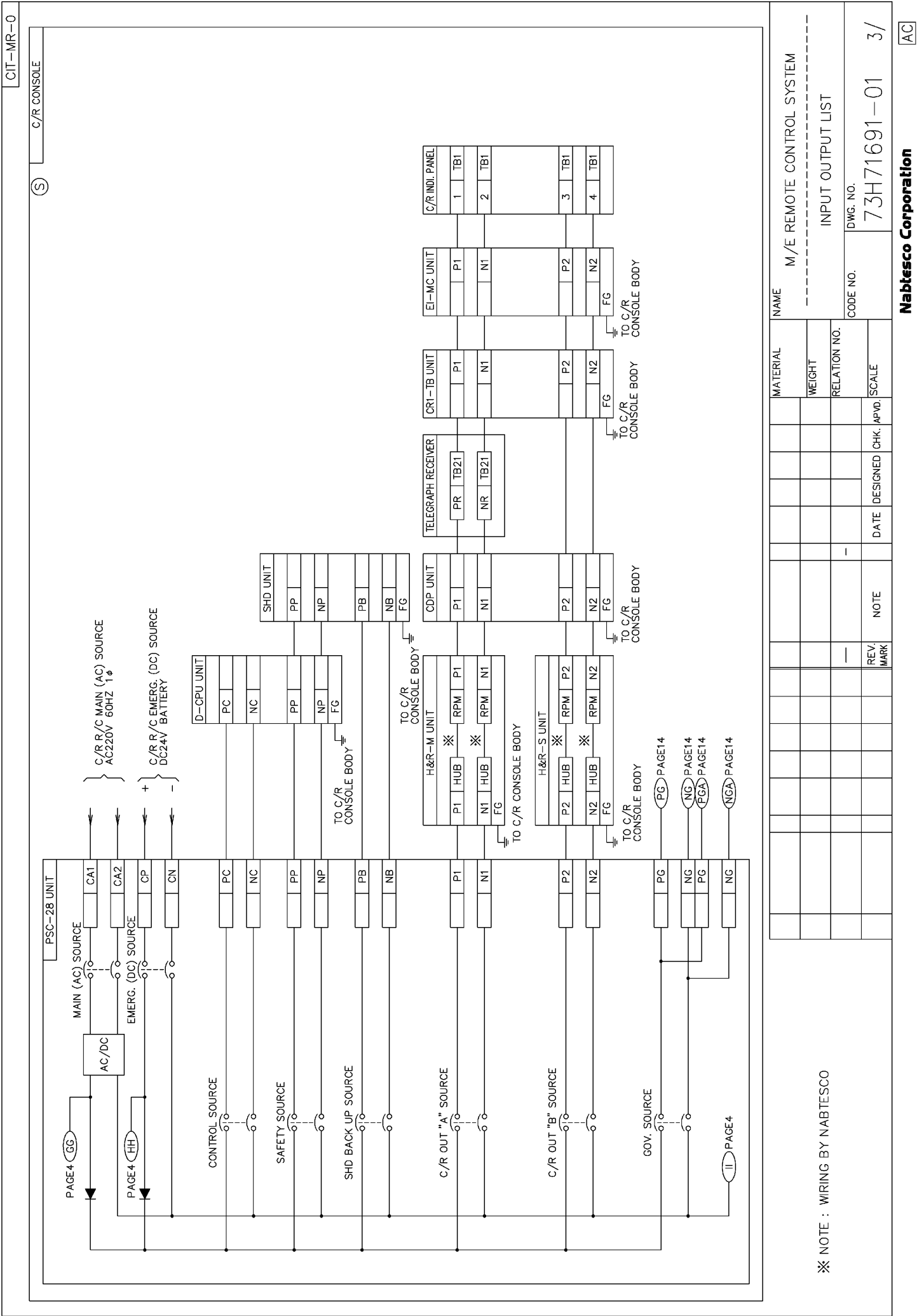


IMPORTANT :
THE CABLE LENGTH FOR COMMUNICATION LINE
FROM BRIDGE TO LOCAL SHALL BE LESS THAN 400M.
IN CASE OF OVER 400M, ADDITIONAL UNIT IS REQUIRED.

Ⓢ : SHIPYARD SUPPLY
ⓔ : ENGINE MAKER SUPPLY
※ NOTE : WIRING BY NABTESCO

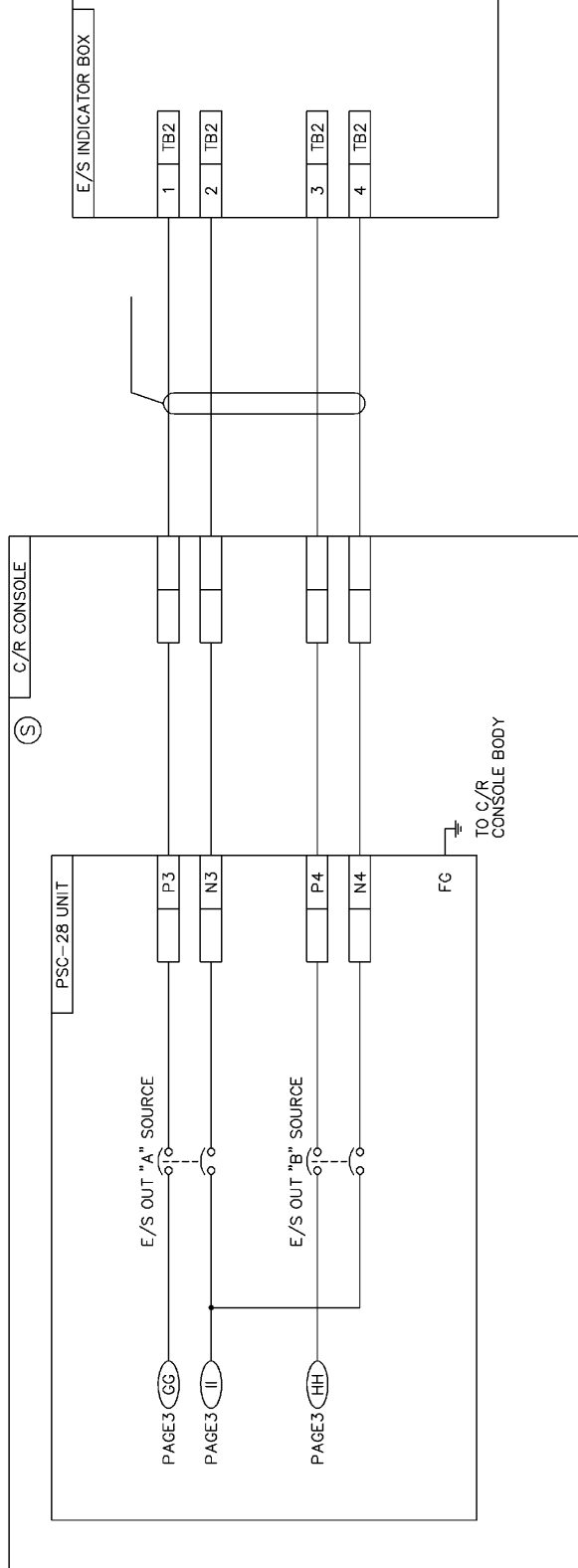
[illegible]





※ NOTE : WIRING BY NABTESCO

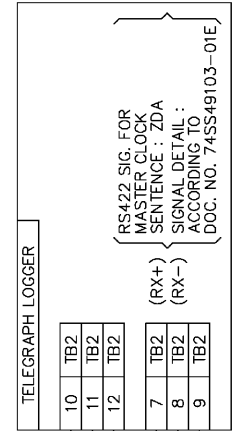
M/E REMOTE CONTROL SYSTEM									
INPUT OUTPUT LIST									
NAME		MATERIAL		WEIGHT		RELATION NO.		CODE NO.	
								DWG. NO.	
								73H71691-01	
								3/	

[illegible]

W/H MANEUV. STAND

Ⓢ

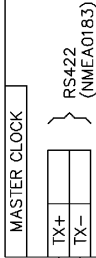
TWIST PAIR EACH SCREEN CABLE



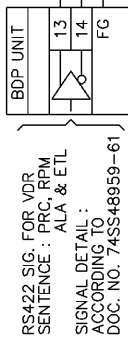
120Ω ※
TO W/H MANEUV.
STAND BODY

120Ω ※
TO W/H MANEUV.
STAND BODY

Ⓢ



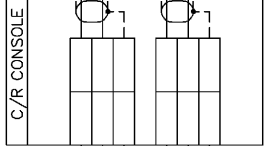
TWIST PAIR EACH SCREEN CABLE



Ⓢ

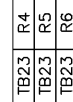
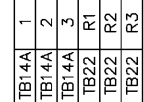
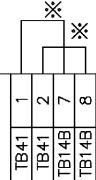
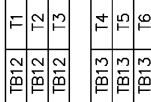


Ⓢ



TWIST PAIR EACH SCREEN CABLE

TELEGRAPH TRANSMITTER



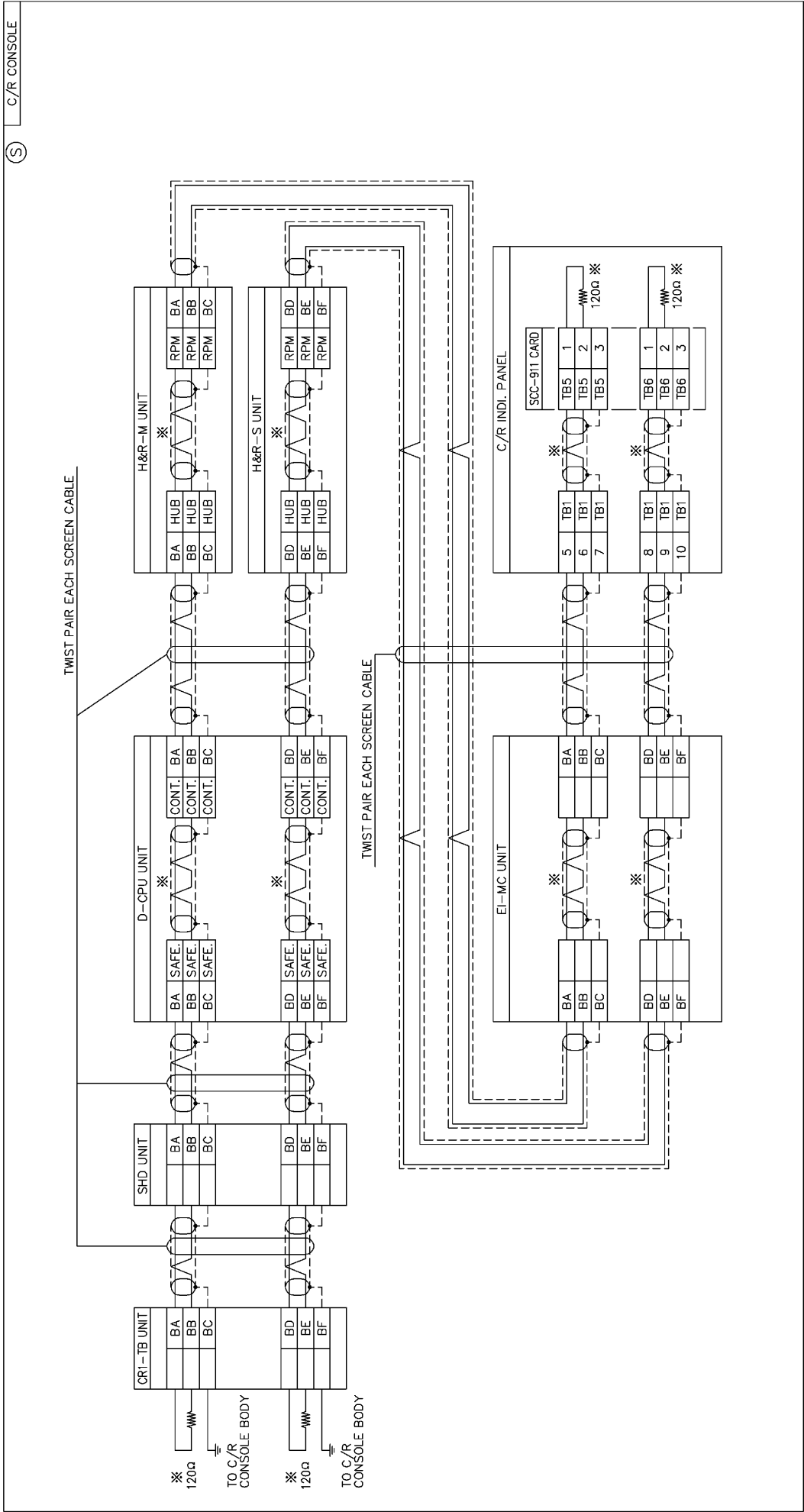
※ NOTE : WIRING BY NABTESCO

NAME	MATERIAL	WEIGHT	RELATION NO.	SCALE	DATE	DESIGNED CHK.	APVD.	REV. MARK	NOTE
M/E REMOTE CONTROL SYSTEM									
INPUT OUTPUT LIST									
CODE NO.			DWG. NO.						
			73H71691-01						
			5/						

Nabtesco Corporation

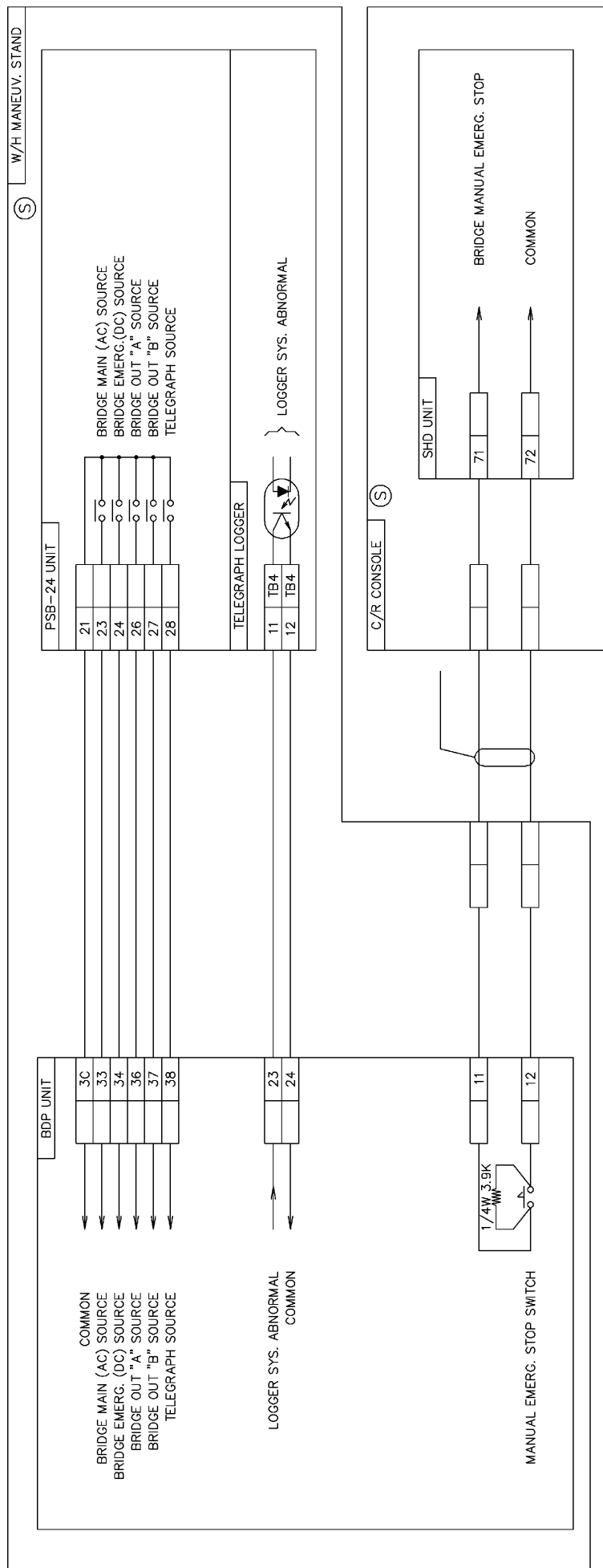
AC

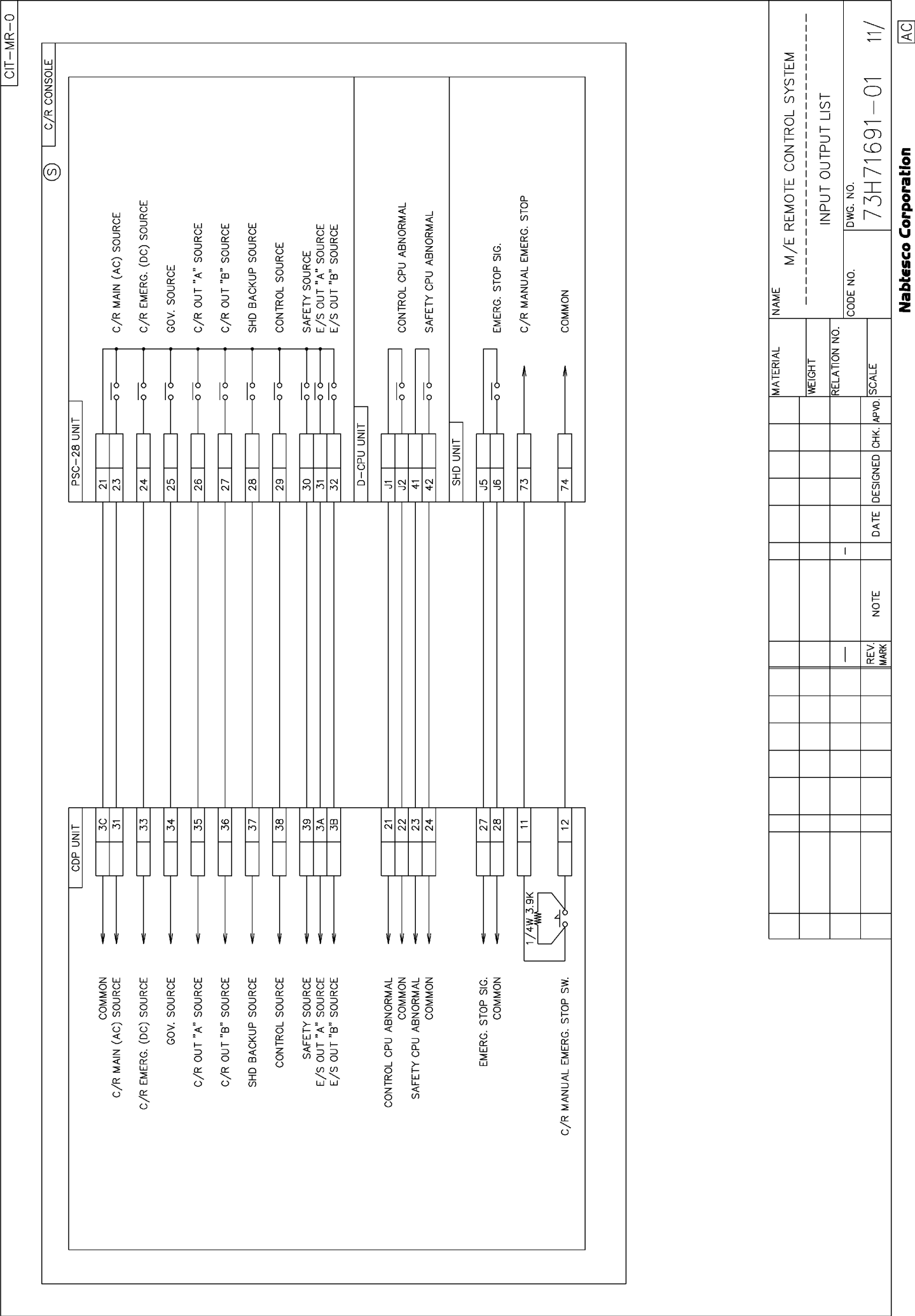
⑤ C/R CONSOLE



※ NOTE : WIRING BY NABTESCO

NAME										M/E REMOTE CONTROL SYSTEM									
MATERIAL										-----									
WEIGHT										INPUT OUTPUT LIST									
RELATION NO.										DWG. NO.									
SCALE										CODE NO.									
APVD.										73H71691-01									
DESIGNED CHK.										7/									
DATE																			
NOTE																			
REV. MARK																			

[illegible]



MATERIAL

WEIGHT

RELATION NO.

SCALE

APVD.

DESIGNED CHK.

DATE

NOTE

REV. MARK

NAME

M/E REMOTE CONTROL SYSTEM

INPUT OUTPUT LIST

CODE NO.

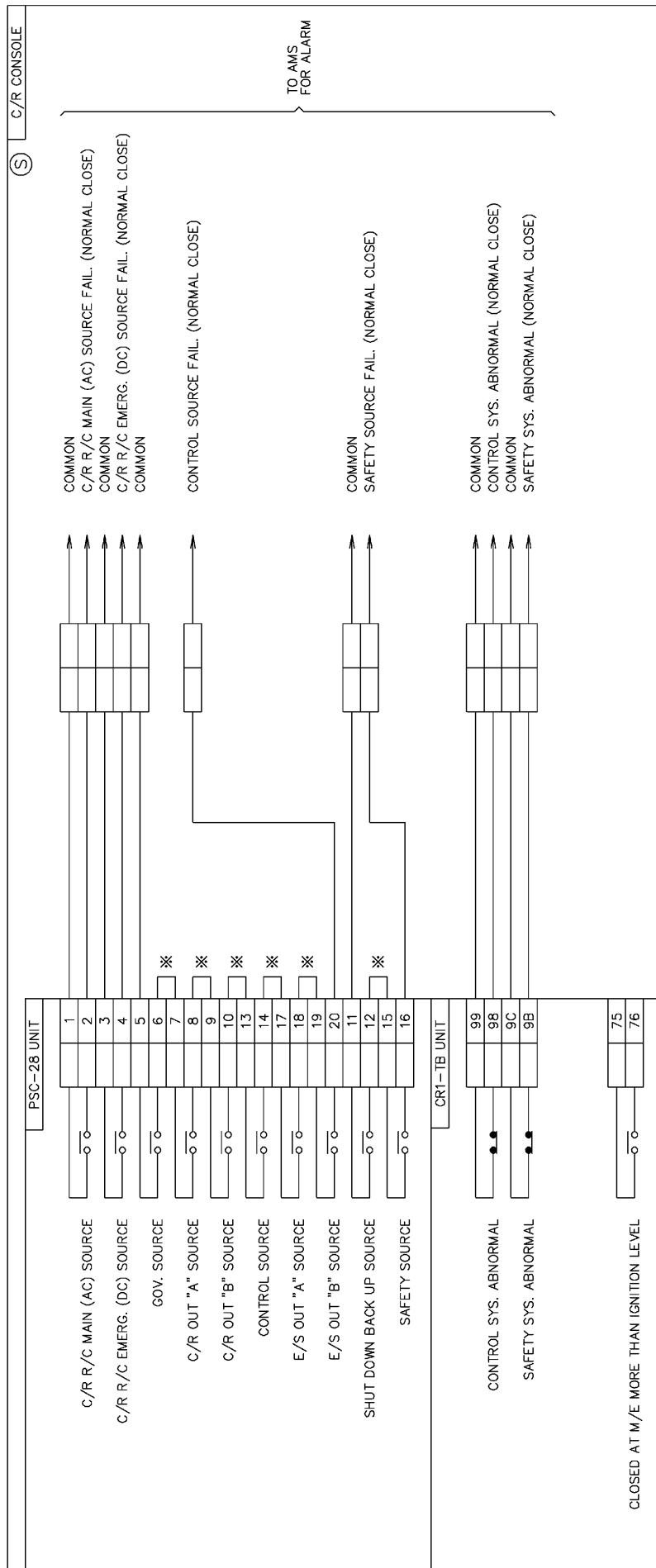
DWG. NO.

73H71691-01

11/

Nabtesco Corporation

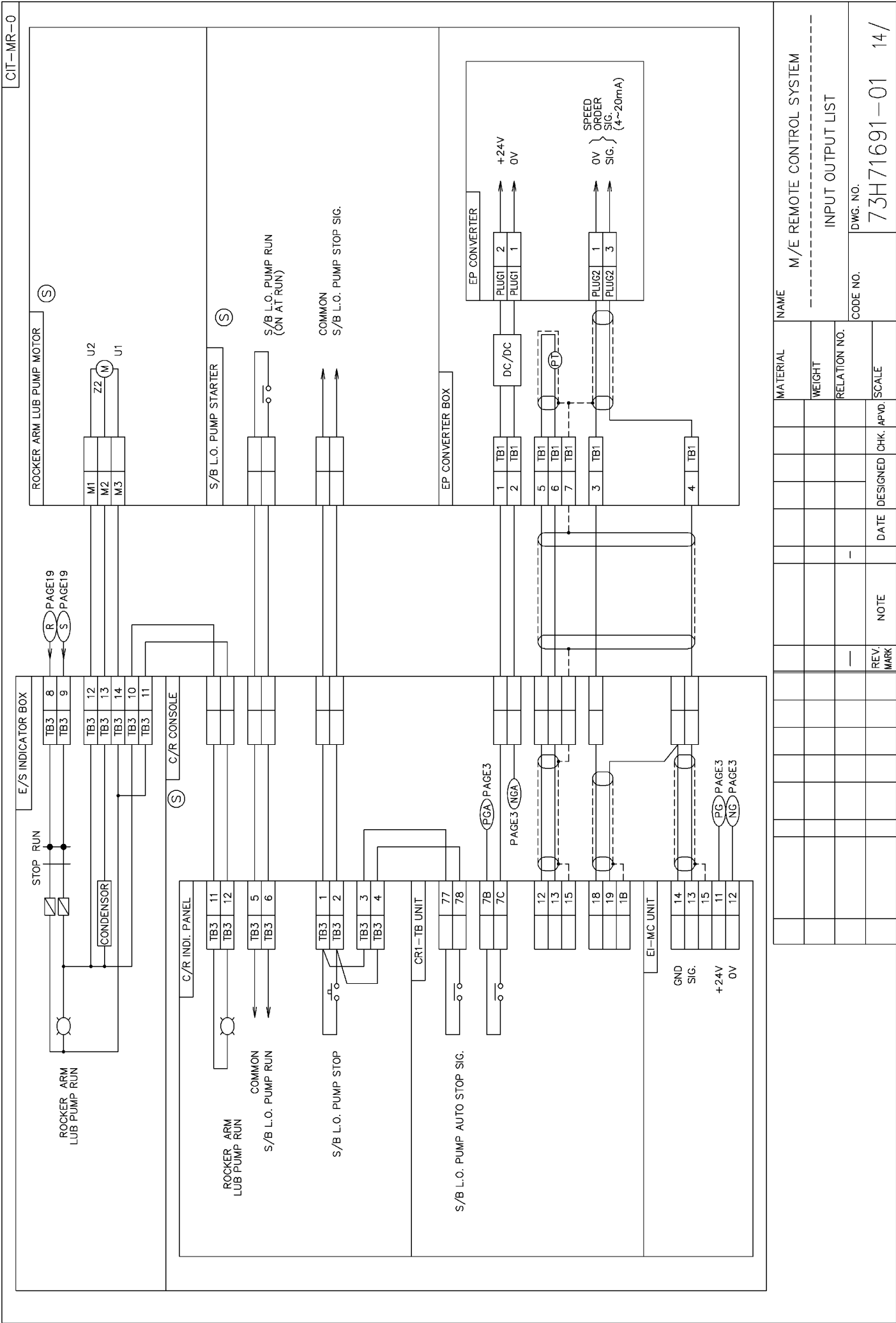
AC



※ NOTE : WIRING BY NABTESCO

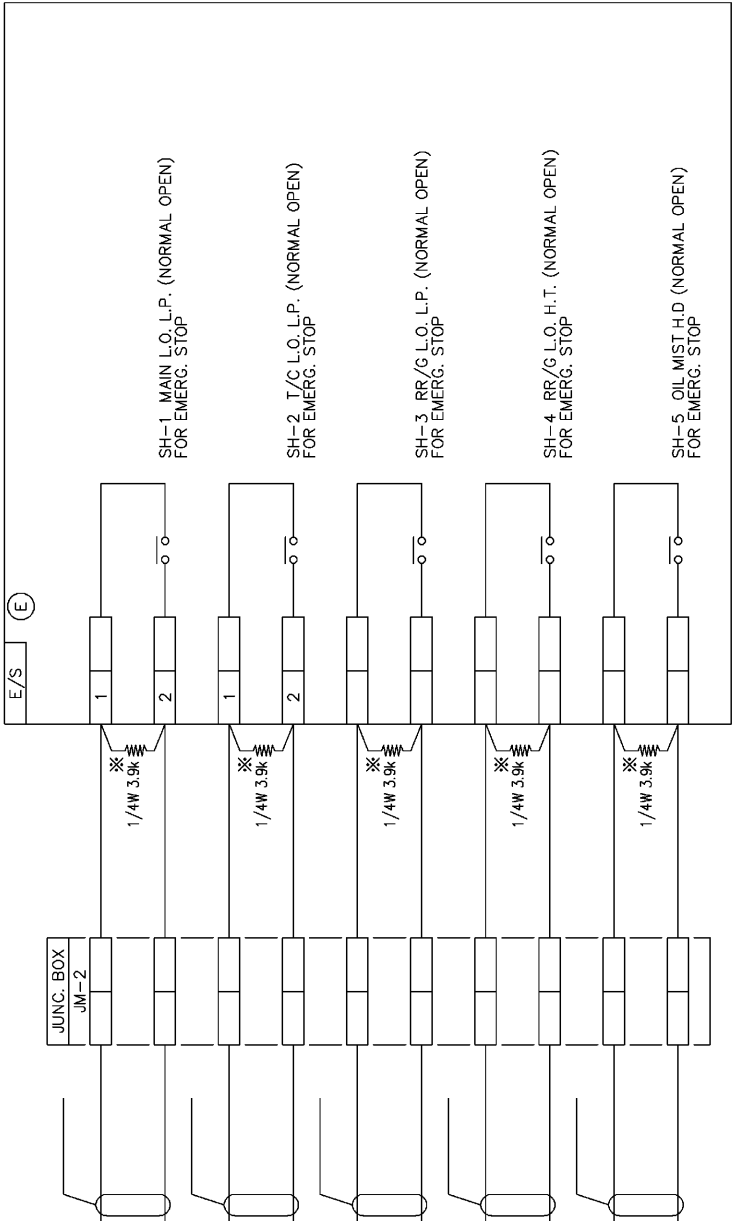
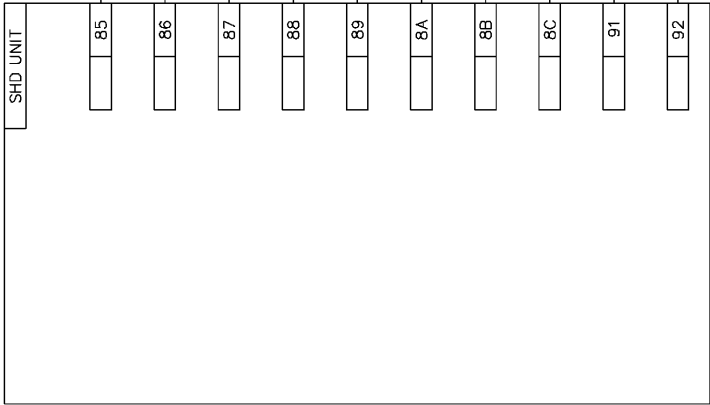
[illegible]

Nabtesco Corporation



NAME		MATERIAL	WEIGHT	RELATION NO.	SCALE
M/E REMOTE CONTROL SYSTEM					
INPUT OUTPUT LIST					
CODE NO.	DWG. NO.	DATE	DESIGNED CHK.	APVD.	SCALE
	73H71691-01				
	14/				

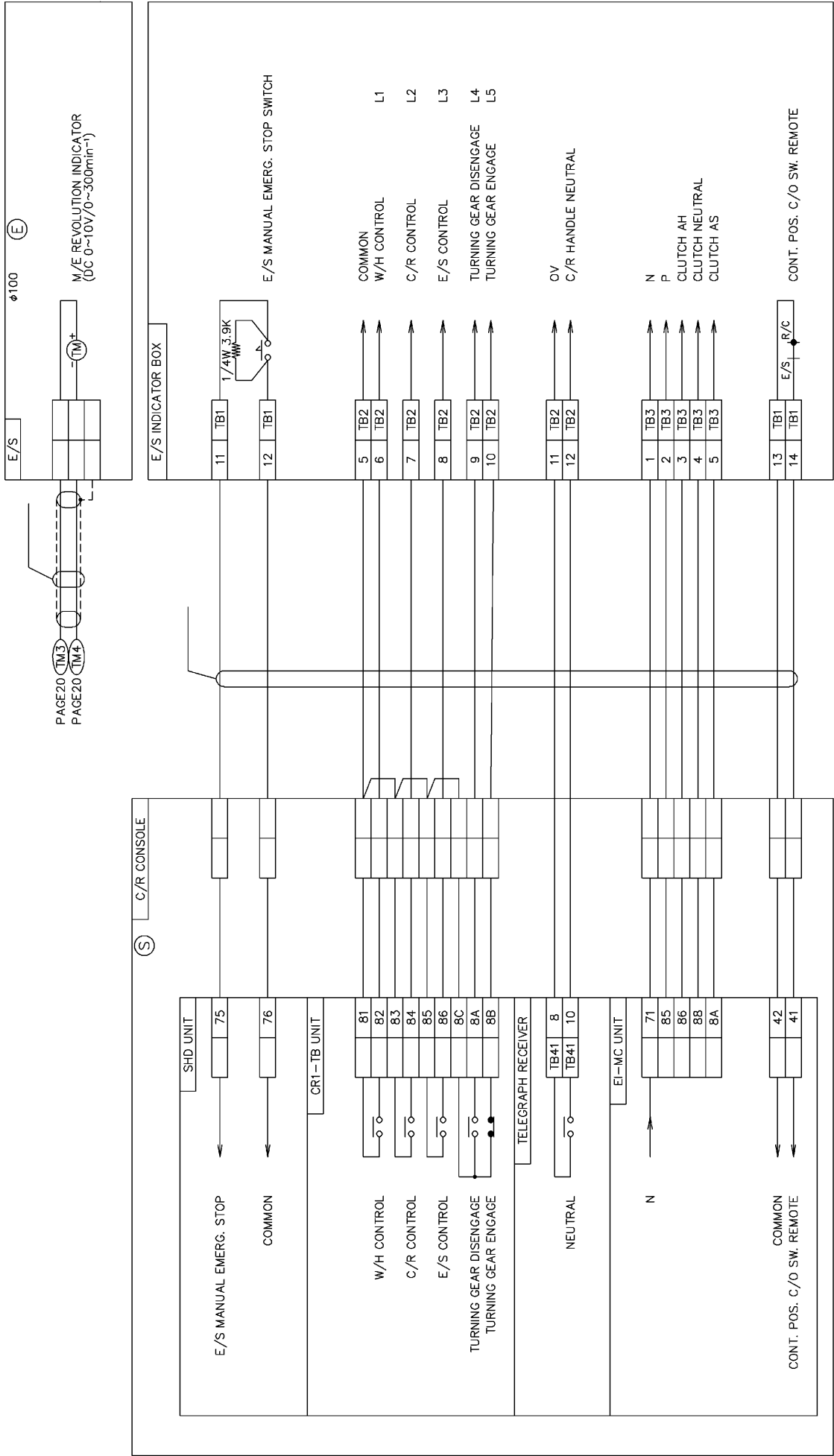
(S) C/R CONSOLE



※ NOTE : ENGINE MAKER SUPPLY

										NAME		M/E REMOTE CONTROL SYSTEM	

												INPUT OUTPUT LIST	
												CODE NO.	DWG. NO.
													73H71691-01
													15/

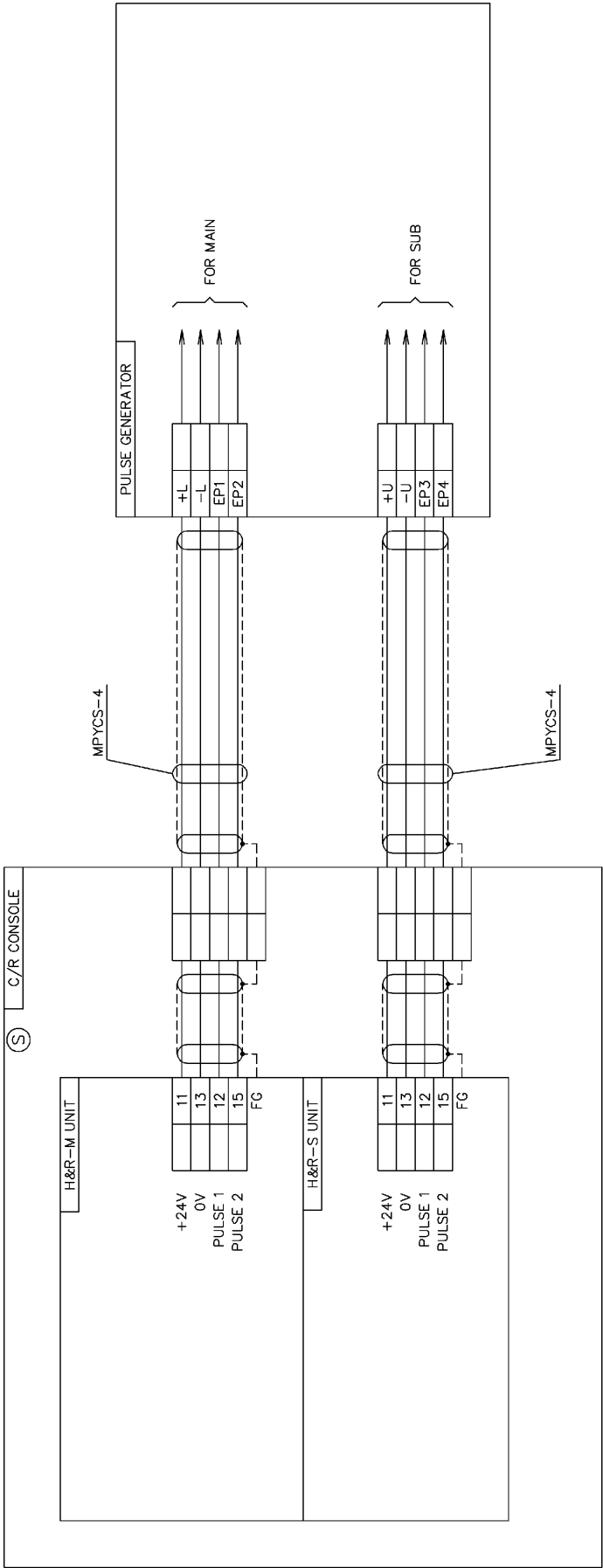


φ100 (E)

M/E REVOLUTION INDICATOR
(DC 0~10V/0~300min-1)

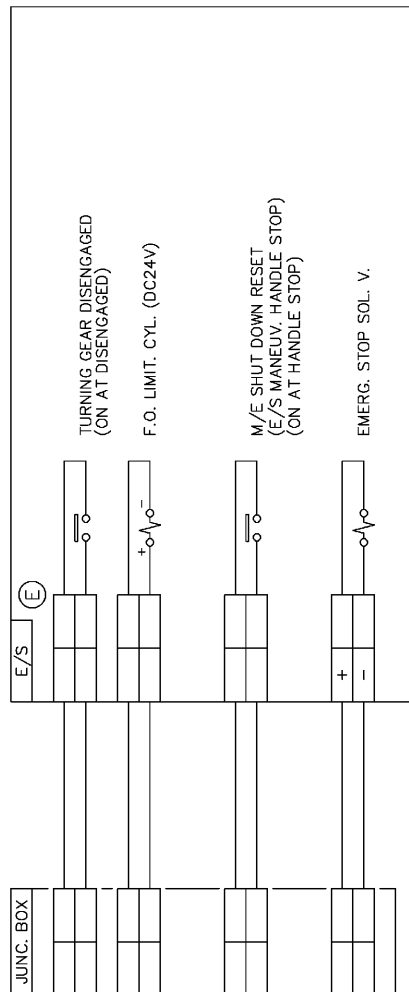
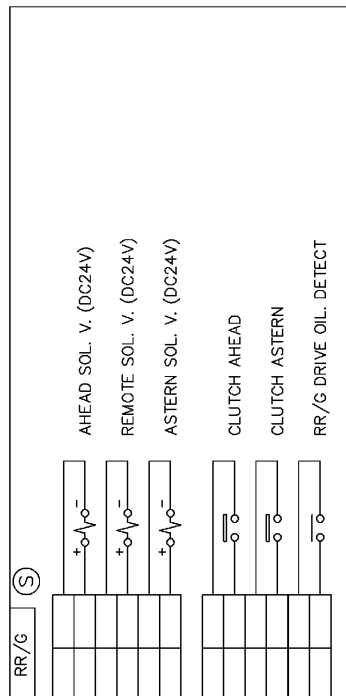
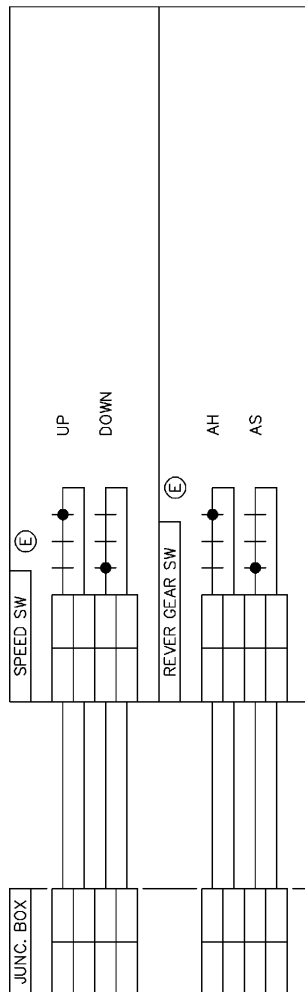
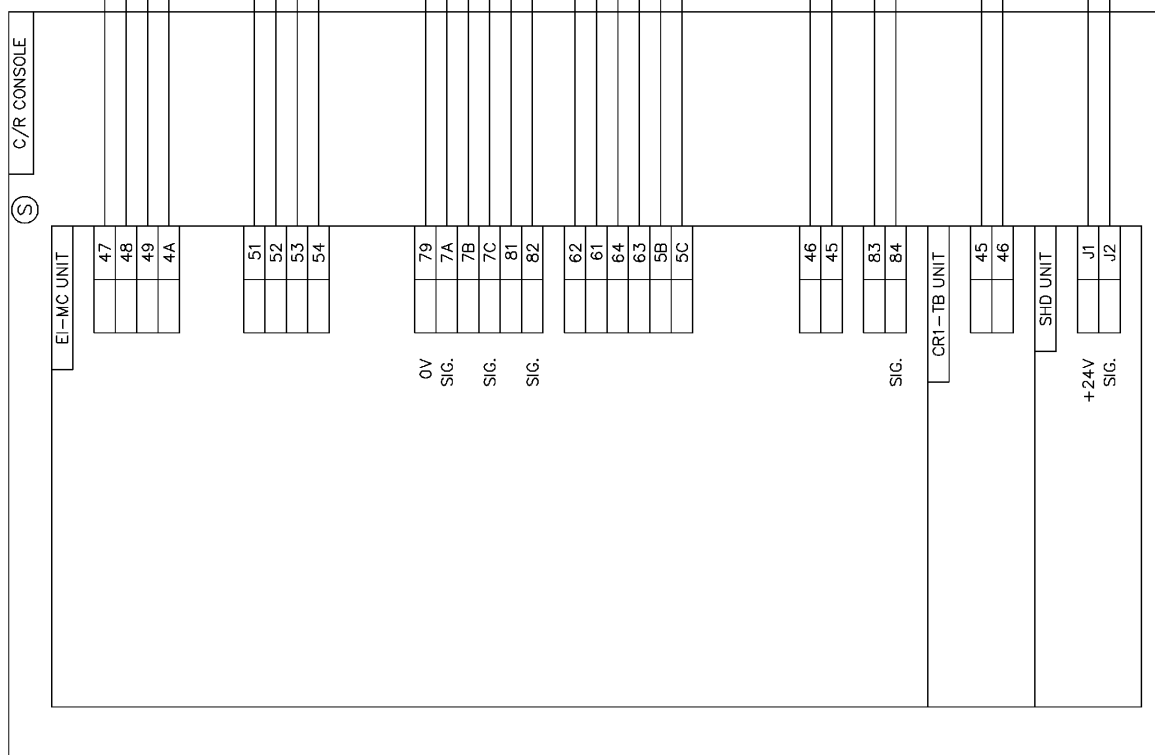
PAGE 20 (TM3)
PAGE 20 (TM4)

NAME		M/E REMOTE CONTROL SYSTEM	
MATERIAL		INPUT OUTPUT LIST	
WEIGHT		DWG. NO.	
RELATION NO.		73H71691-01	
SCALE		16/	
APVD.		AC	
DESIGNED		DATE	
CHK.		NOTE	
REV.		MARK	



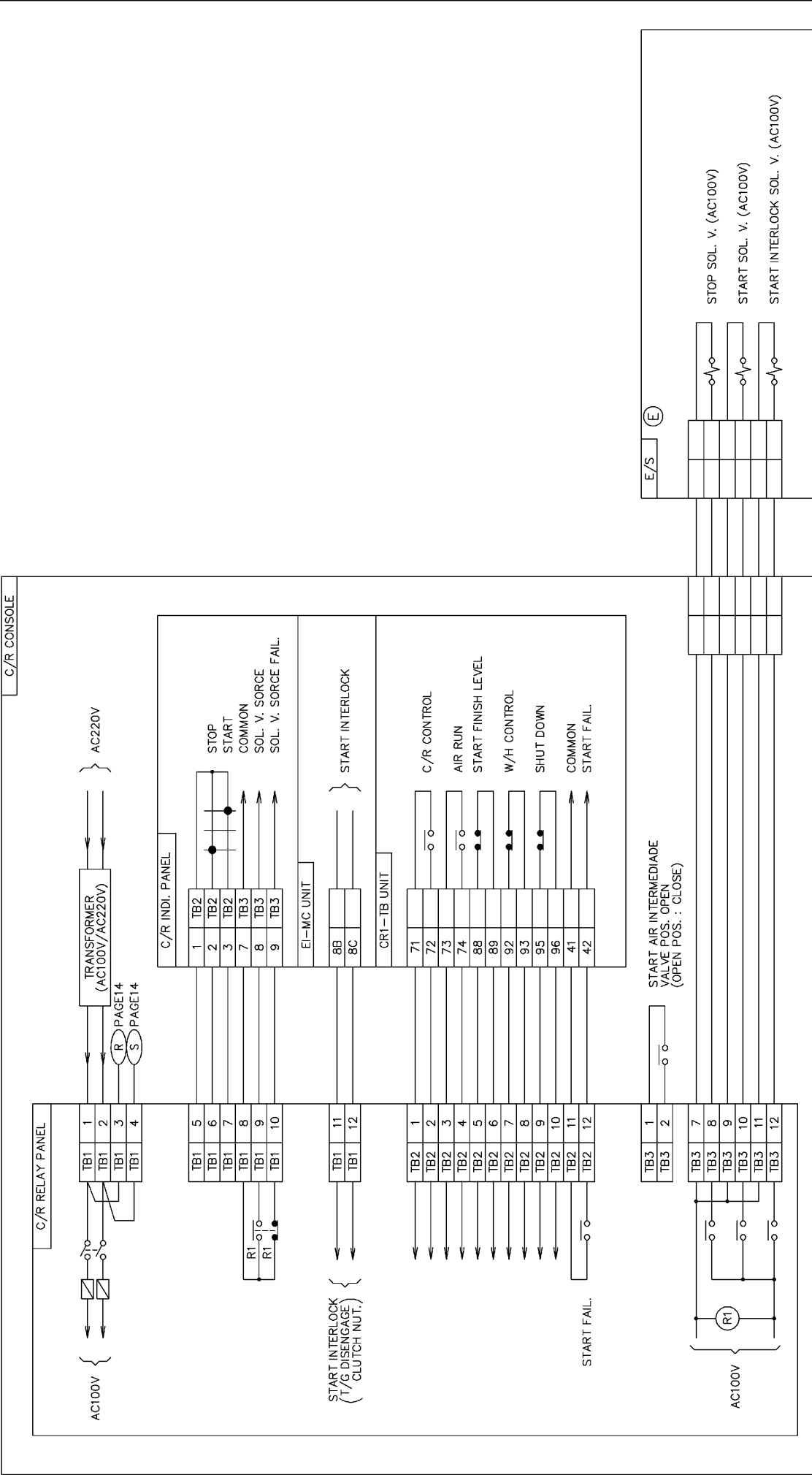
										NAME		M/E REMOTE CONTROL SYSTEM	

												INPUT OUTPUT LIST	
										CODE NO.		DWG. NO.	
												73H71691-01	
												17/	



※ NOTE : ENGINE MAKER SUPPLY

NAME													M/E REMOTE CONTROL SYSTEM													-----												



MATERIAL		NAME		M/E REMOTE CONTROL SYSTEM	
WEIGHT		RELATION NO.		INPUT OUTPUT LIST	
APVD.		DESIGNED CHK.		DATE	
SCALE		REV. MARK		NOTE	
CODE NO.		DWG. NO.		73H71691-01	
19/					

COMPONENTS LIST

FOR

M-800-VII MAIN ENGINE REMOTE CONTROL SYSTEM

SHIPYARD : ZHEJIANG ZHENXING SHIPBUILDING & REPAIR CO., LTD.

SHIP NO. : 2306

RULE : CCS(BRC)

ENGINE MAKER : AKASAKA DIESELS LIMITED

ENGINE TYPE : AKASAKA A41S (E.NO.2022)

CUSTOMER : AKASAKA DIESELS LIMITED

Nabtesco Corporation

MARINE CONTROL SYSTEMS COMPANY

DESIGN DEPARTMENT

-						2023 7/3	高杉	竹村	三木	竹下			
REV. MARK	NOTE					APPLY LEVEL	DESIGNED		CHK	APVD.			

REV.	REF. NO.	NABTESCO PC NO.	DESCRIPTION	TYPE	Q'Ty	PAINTING COLOR/MARK	MANUFACTURE PROCEDURE	REMARKS	SUPPLIED BY
	100	(F3768340-01) 73768342-01	BDP UNIT	BDP_7G	1	MAKER'S STANDARD , TZZ		INSTALLED ON W/H MANEUVE. STAND	NABTESCO
	110	73768788-03	PSB-24 UNIT	PSB-24	1	MAKER'S STANDARD , TZZ		INSTALLED IN W/H MANEUVE. STAND	NABTESCO
	120	(F3768976-08) 73768976-08	MT-800-VIIT7608L TELEGRAPH TRANSMITTER	MT-800-VII	1	MAKER'S STANDARD , TZZ		INSTALLED ON W/H MANEUVE. STAND	NABTESCO
	130	(F3764500) 73764500-01	ML-800-V-D TELEGRAPH LOGGER		1	MAKER'S STANDARD N1.0 , TZZ		INSTALLED ON W/H MANEUVE. STAND TYPE : D	NABTESCO

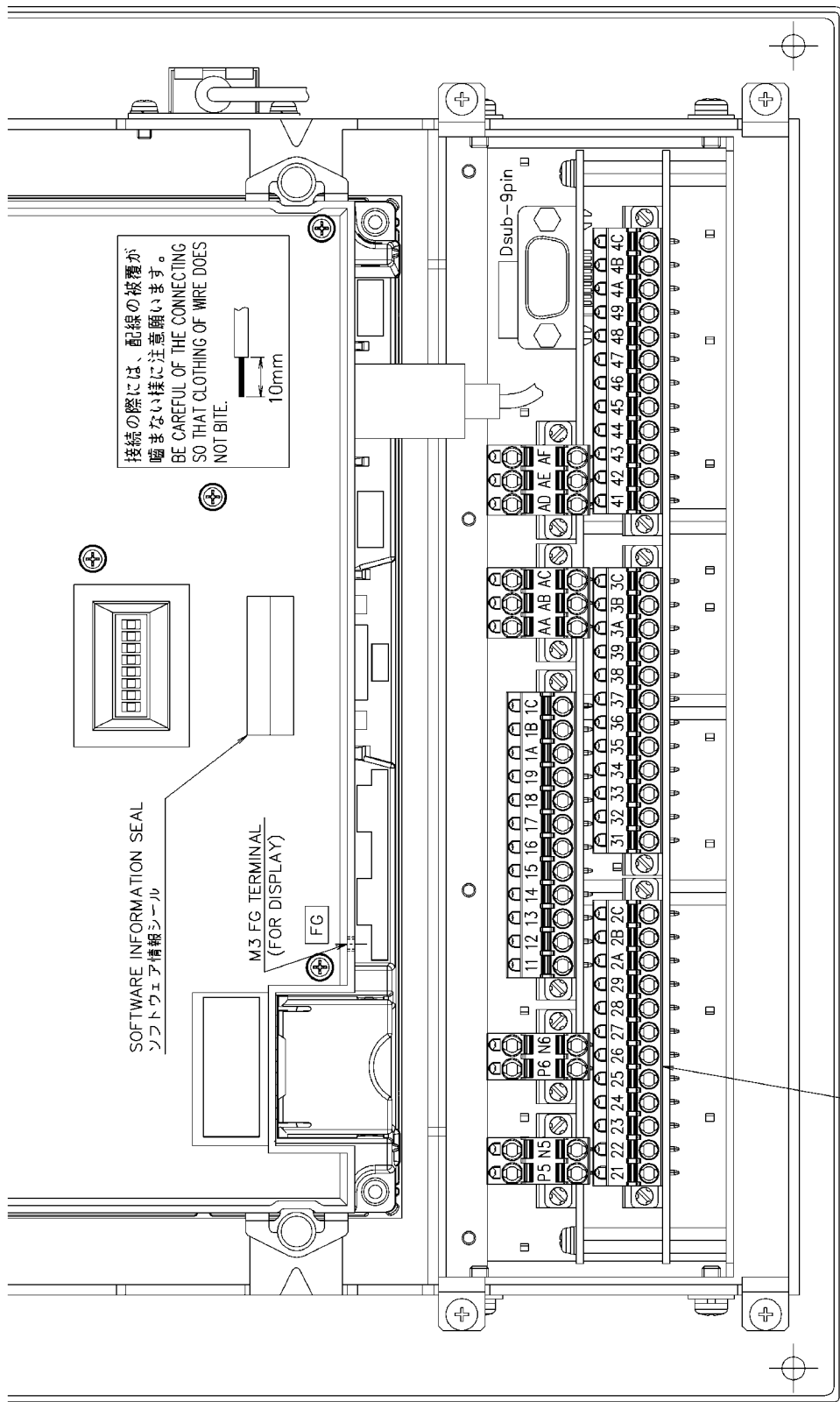
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	200	(F3768350-01) 73768352-06	CDP UNIT	CDP_7G	1	MAKER'S STANDARD , TZZ		INSTALLED ON C/R CONSOLE	NABTESCO
	210	(F3768976-09) 73768976-09	MT-800-VIR7609LM TELEGRAPH RECEIVER	MT-800-VII	1	MAKER'S STANDARD , TZZ		INSTALLED ON C/R CONSOLE	NABTESCO
	220	73104797-01	C/R INDICATOR PANEL		1	7.5BG 7/2 , T22		INSTALLED ON C/R CONSOLE	NABTESCO
	230	73104798-01	C/R RELAY PANEL		1	7.5BG 7/2 , T22		INSTALLED IN C/R CONSOLE	NABTESCO
	240	(F3766680-02) 73766680-02	TRANSFORMER		1	MAKER'S STANDARD , TXX		INSTALLED IN C/R CONSOLE AC220V/100V(500VA)	NABTESCO
	250	74079194-01	DC/DC CONVERTER FOR SCR		1	MAKER'S STANDARD , TXX		INSTALLED IN C/R CONSOLE 0~10V/4~20mA	NABTESCO

REV.	REF. NO.	NABTESCO PC NO.	DESCRIPTION	TYPE	Q'Ty	PAINTING COLOR/MARK	MANUFACTURE PROCEDURE	REMARKS	SUPPLIED BY
	300	73768318-01	D-CPU UNIT (FOR CONTROL & SAFETY)	D-CPU_7G	1	MAKER'S STANDARD , TZZ		INSTALLED IN C/R CONSOLE	NABTESCO
	310	73768319-01	CR1-TB-R1A1I1 UNIT (FOR SIGNAL INTERFACE)	CR1-TB_7G	1	MAKER'S STANDARD , TZZ		INSTALLED IN C/R CONSOLE	NABTESCO
	320	73768322-02	SHD-10 UNIT (FOR SAFETY CONTROL)	SHD_7G	1	MAKER'S STANDARD , TZZ		INSTALLED IN C/R CONSOLE	NABTESCO
	330	73768323-01	H&R-M UNIT (FOR HUB & RPM SIG INTERFACE)	H&R_7G	1	MAKER'S STANDARD , TZZ		INSTALLED IN C/R CONSOLE	NABTESCO
	340	73768323-51	H&R-S UNIT (FOR HUB & RPM SIG INTERFACE)	H&R_7G	1	MAKER'S STANDARD , TZZ		INSTALLED IN C/R CONSOLE	NABTESCO
	350	737683789-01	PSC-28 UNIT	PSC-28	1	MAKER'S STANDARD , TZZ		INSTALLED IN C/R CONSOLE	NABTESCO
	360	73768324-52	EI-MC UNIT (FOR ENGINE IF & BACKUP CONT.)	EI-MC_7G	1	MAKER'S STANDARD , TZZ		INSTALLED IN C/R CONSOLE	NABTESCO

REV.	REF. NO.	NABTESCO PC NO.	DESCRIPTION	TYPE	Q'Ty	PAINTING COLOR/MARK	MANUFACTURE PROCEDURE	REMARKS	SUPPLIED BY
	700	73104796-01	E/S INDICATOR BOX		1	7.5BG 7/2 , T22		FITTED TO M/E	NABTESCO
	-1		TELEGRAPH RECEIVER		(1)				NABTESCO
	710	74767588-11	EG30-LL GONG		1	MAKER'S STANDARD , TZZ		FITTED TO M/E	NABTESCO
	720	73750626-01	PG-40A PULSE GENERATOR		1	MAKER'S STANDARD N4.0 , TZZ		FITTED TO M/E	NABTESCO
	730	73091468-63	GEP CONVERTER BOX		1	7.5BG 7/2 , T22			NABTESCO
	900	74Y60429-01	SPARE PARTS		1	MAKER' S STANDARD 7.5BG 7/2 , T02			NABTESCO

部	呼称	寸法区分	許容差	307mm以下	307mm以上1200以下	0.3	表面アラサ	▽▽▽	6.3S	(1.6a)
リ	0.5以上 6以下	0.1	1207mm以下	0.5	41.1以下	Rmax	(Ra)	▽▽	25S	(6.3a)
上	67mm以下 30以下	0.2	3157mm以下	1000以下	0.8	▽▽▽▽	0.8S	▽	100S	(25a)

CIT-MR-0



TERMINAL BOARD
端子台
NOTE 2 / NOTE 3

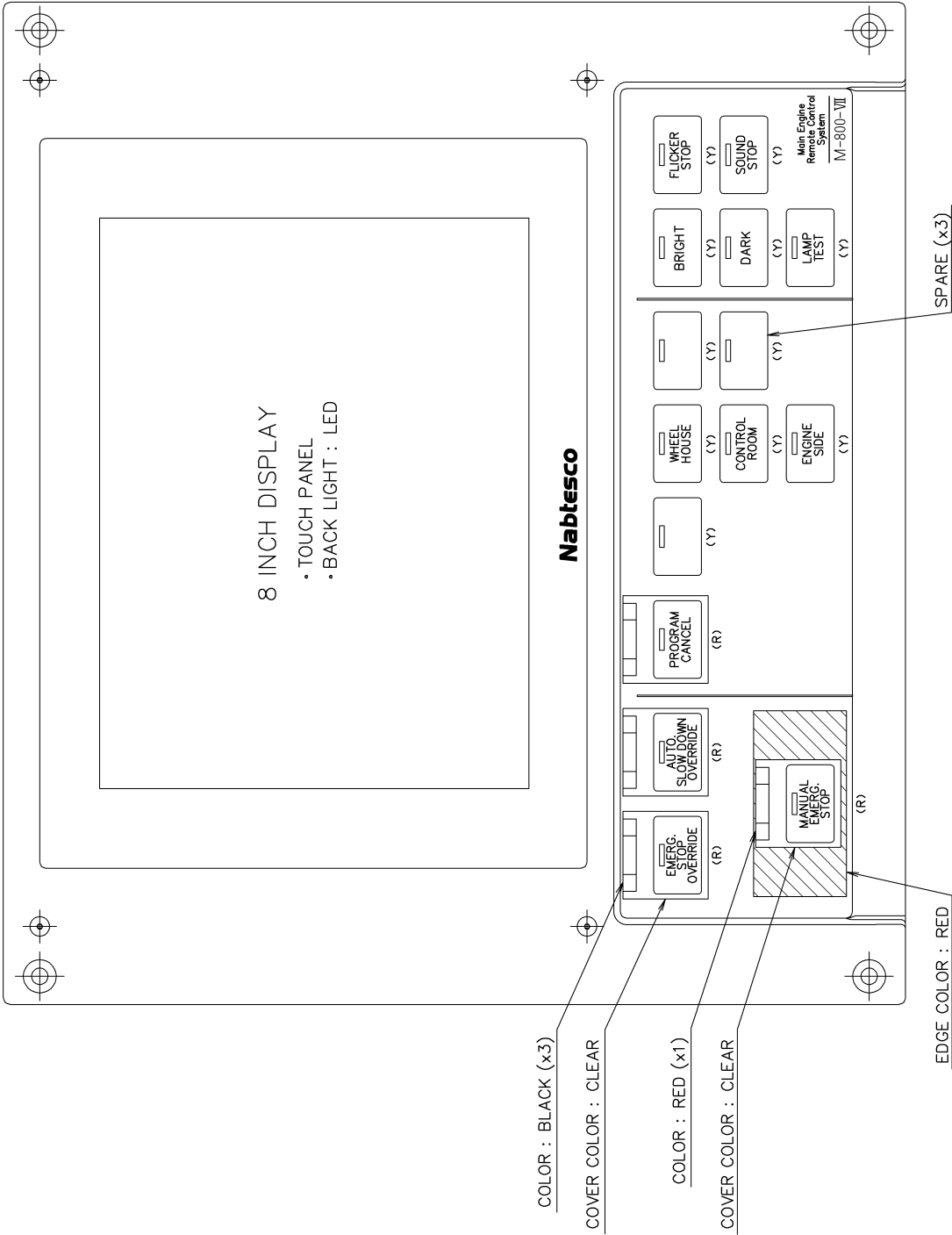
TERMINAL BOARD ARRANGEMENT
端子台配列図

NOTE 2 : SCREWLESS TYPE TERMINAL BOARD
スクレスタイプ端子台
NOTE 3 : WIRES SIZE 0.2 ~ 2.5mm²
電線サイズ

NAME	BDP UNIT OUTLINE (8INCH)									
MATERIAL										
WEIGHT										
RELATION NO.										
CODE NO.										
DESIGNED										
CHK. APD.										
DATE										
NOTE										
REV. MARK										
SCALE	1 : 1									
DWG. NO.	F3768340-01 2/2									

呼び寸法区分	許容差	表面アラサ	±0.3	▽▽▽	6.3S	(1.6a)
0.5以上 6以下	±0.1	120マイクロ315以下	±0.5	仕上記号	Rmax	(Ra)
6マイクロ 30以下	±0.2	315マイクロ1000以下	±0.8	▽▽▽▽	0.8S	(0.2a)
加工				▽	100S	(25a)

CIT-MR-0



- ILLUMINATED PUSH BUTTON SWITCH : (WITH COVER)
- ILLUMINATED PUSH BUTTON SWITCH
- INDICATION COLOR (R) : RED (Y) : YELLOW
- ILLUMINATION COLOR : ALL WHITE

NAME		BDP UNIT (BDP_7G)	
MATERIAL		ARRANGEMENT	
WEIGHT		RELATION NO.	
OUT LINE		竹下	
F3768340-01		三木	
SCALE		S.F	
1 : 1.4		2022	
CHK. APVD.		9/26	
DESIGNED		DATE	
NOTE		UE	
REV. MARK		M:73768341-01	
CODE NO.		DWG. NO.	
73768342-01		73768342-01	

測定項目	測定方法	測定範囲	測定結果	測定単位	測定場所	測定時期	測定者	測定結果	測定単位	測定場所	測定時期	測定者
0.5以下	0.1	1207mm	315以下	0.5	1.1以下	Rmax	(Ra)	▽▽	▽▽	6.3S	(1.6a)	
0.5以下	0.1	1207mm	315以下	0.5	1.1以下	Rmax	(Ra)	▽▽	▽▽	25S	(6.3a)	
0.5以下	0.1	1207mm	315以下	0.5	1.1以下	Rmax	(Ra)	▽▽	▽▽	100S	(25a)	

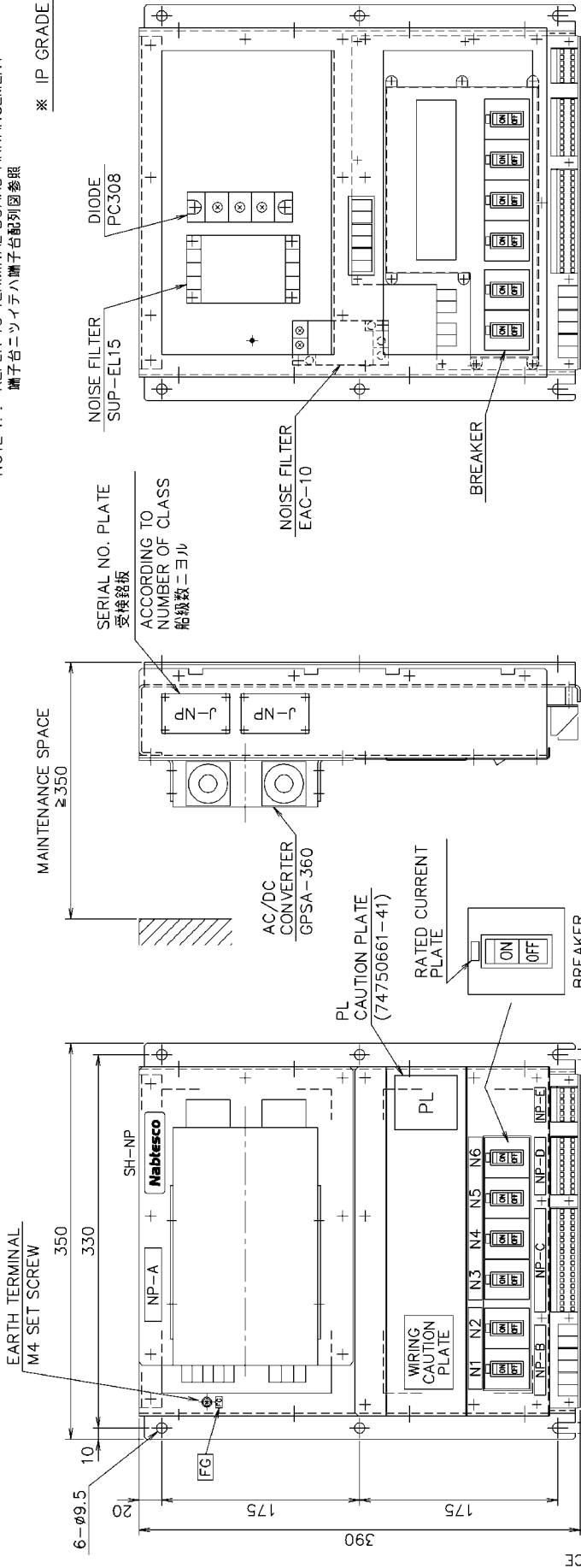
CIT-MR-0

NOTE 1.: REFER TO TERMINAL BOARD ARRANGEMENT
端子台ニツィテハ端子台配列図参照

※ IP GRADE : IP 00

EARTH TERMINAL

M4 SET SCREW



INTERNAL ARRANGEMENT

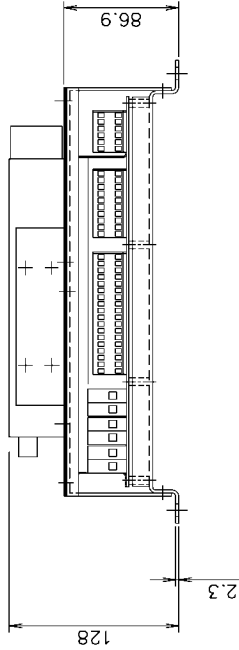
PSB-24 UNIT

NP-A

NAME PLATE

MAIN SOURCE (AC)
N1
EMERG. SOURCE (DC)
N2
NAME PLATE

BRIDGE OUT "A" SOURCE
N3
BRIDGE OUT "B" SOURCE
N4
TELEG. SOURCE
N5
NOT USE
KEEP OFF POSITION
N6
NAME PLATE



PAIN COLOR : NOTHING PAINT
塗装色 : 塗装無し

SURFACE TREATMENT : ZINC PLATING (CHROMATE TREATMENT)
表面処理 : 亜鉛メッキ(クロメート処理)

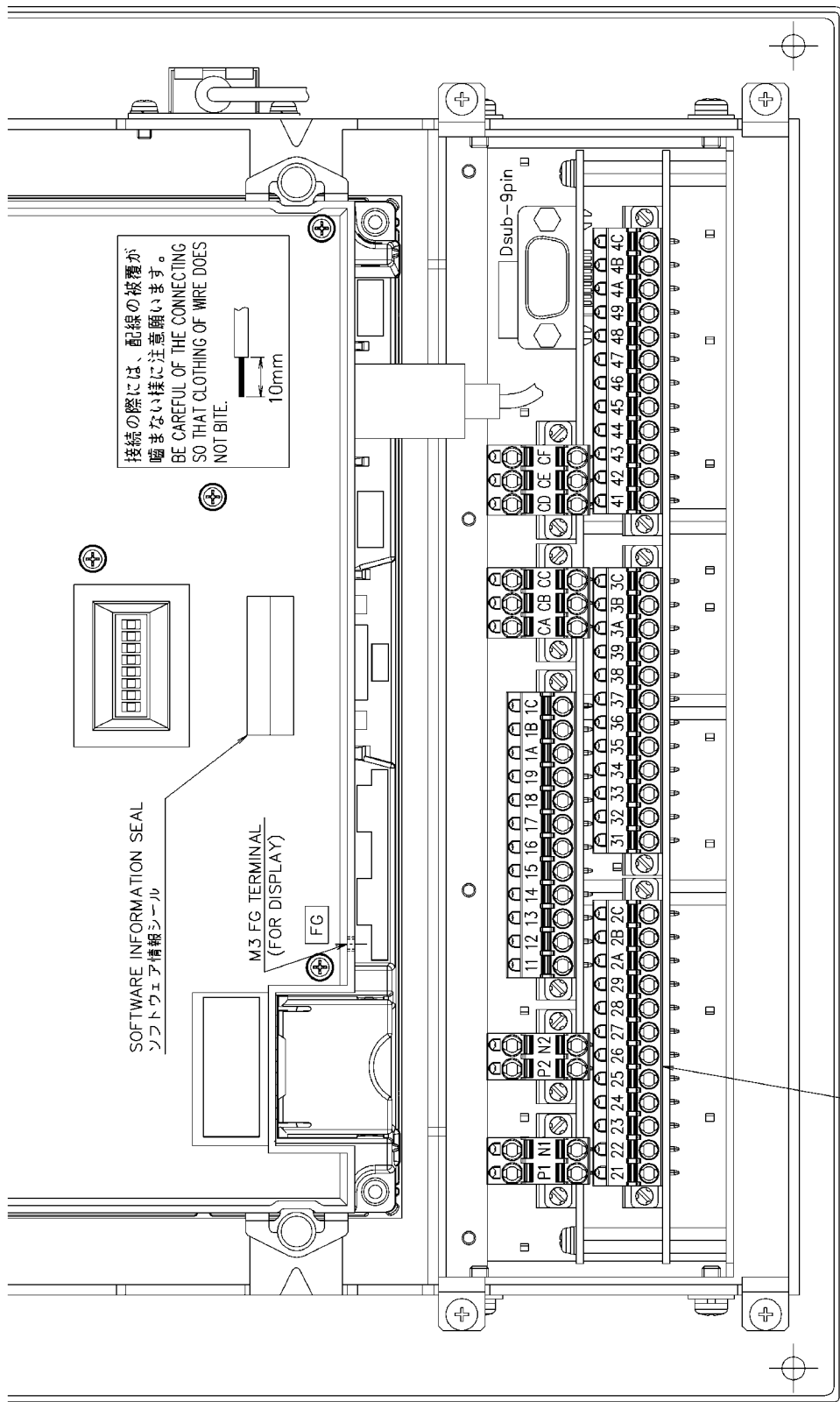
NAME		PSB-24 UNIT	
MATERIAL			
WEIGHT		9.8kg	
RELATION NO.		機原	
DESIGNED		高杉	
DATE		2022 4/12	
NOTE		M: 73763647-03 SPC: 04.12	
REV.		MARK	
SCALE		1 : 4	
CODE NO.		73768788-03	
DWG. NO.		1/2	

Nabtesco Corporation

AC

部	呼称	寸法区分	許容差	307mm以下	307mm以上1200以下	0.3	表面アラサ	▽▽▽	6.3S	(1.6μ)
リ	0.5以上 6以下	0.1	1207mm以下	0.5	41.1μ以下	Rmax	(Ra)	▽▽	25S	(6.3μ)
上	67mm以下 30以下	0.2	3157mm以下	1000以下	0.8	▽▽▽▽	0.8S	▽	100S	(25μ)

CIT-MR-0



TERMINAL BOARD
端子台
NOTE 2 / NOTE 3

TERMINAL BOARD ARRANGEMENT
端子台配列図

NOTE 2 : SCREWLESS TYPE TERMINAL BOARD
スクレスタイプ端子台

NOTE 3 : WIRES SIZE 0.2 ~ 2.5mm²
電線サイズ

NAME	CDP UNIT OUTLINE (8INCH)									
MATERIAL										
WEIGHT										
RELATION NO.										
DESIGNED										
CHK. APD.										
DATE										
NOTE										
REV. MARK										
SCALE	1 : 1									
CODE NO.	F3768350-01									
DWG. NO.	2/2									

[illegible]

CIT-MR-0

L5	RUN	GREEN	BLACK	
L4	CONT. SOL. V. S. FAIL.	RED	BLACK	
L3	CONT. SOL. V. SOURCE	WHITE	BLACK	
PB2	STOP	RED	BLACK	
PB1	LAMP TEST	WHITE	BLACK	
L NO.	LAMP LETTERING	FILTER COLOR	LETTER COLOR	

N4	ROCKER ARM LUB OIL PUMP	BLACK	15x50
N3	STAND-BY LUB OIL PUMP	BLACK	15x50
N2	M/E CONTROL	BLACK	10x50
N1	CONTROL & MODE POSITION	BLACK	15x50
N ₁ NO.	NAME PLATE LETTERING	COLOR	SIZE

SW-MC	STOP	RUN	START	BLACK	BN
SW-CPC	BACKUP	C/R	W/H	BLACK	BN
SW. NO.	NAME PLATE LETTERING			LETTER. COLOR	TYPE OR SIZE

NAME									
C/R INDICATOR PANEL									
NAME PLATE LETTERING									
MATERIAL									
WEIGHT									
RELATION NO.									

IDECLBシリーズ

- ・PB1,PB2,L3,L4：フラッシュメモリ、正方形型(□22)
- ・L5：表示灯(AC100V)

AC

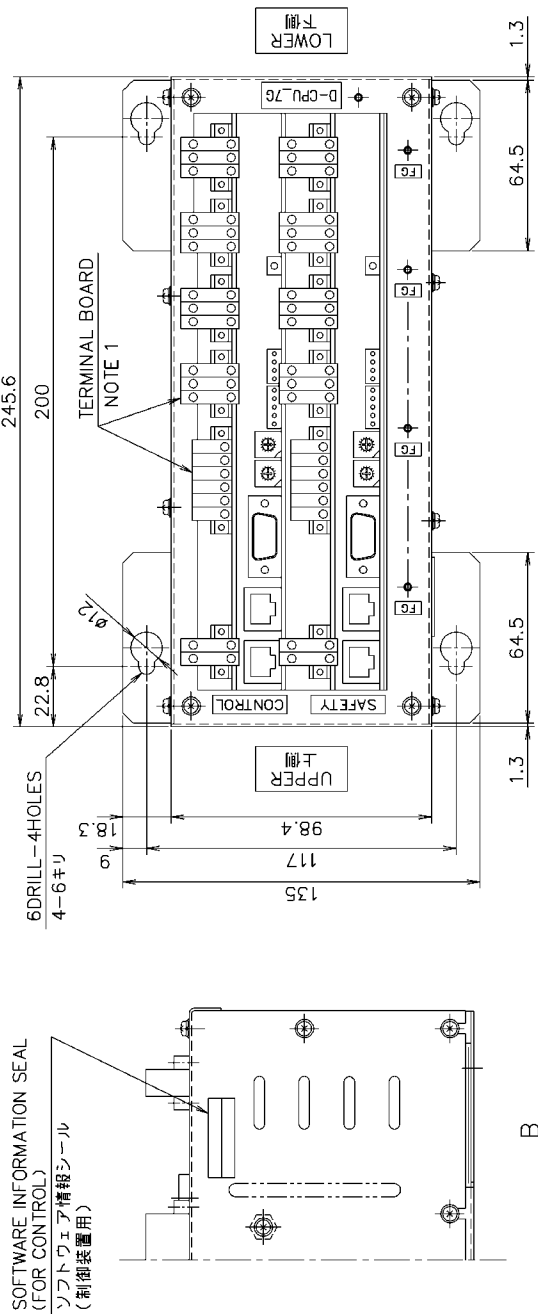
Nabtesco Corporation

制 リ 寸	呼び寸法メ分	許容差	307コア120以下	0.3	片面アラサ	V V V	6.3S	(1.6a)
0.3以上 6以下	-0.1	120コア315以下	-0.5	片面分	Rmax	(Ra)	25S	(6.3a)
67コア 30以下	-0.2	315コア1000以下	-0.8	▽▽▽▽	0.8S	(0.2a)	▽	100S
								(25a)

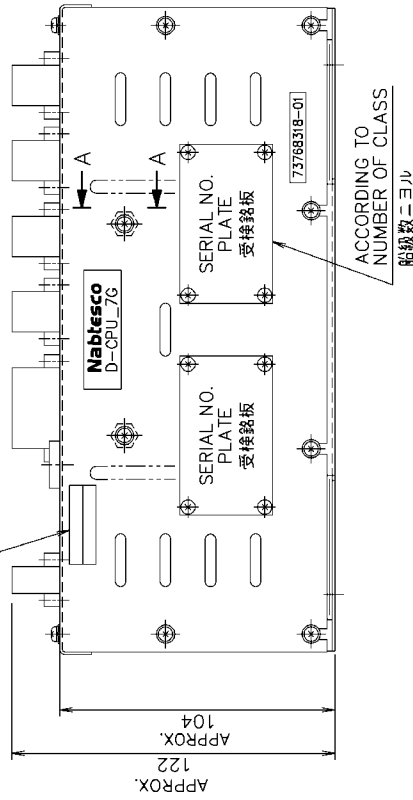
CIT-MR-0

NOTE 1 : REFER TO TERMINAL BOARD ARRANGEMENT
端子台ニツイテハ端子台配列図参照

※ IP GRADE : IP 00



SOFTWARE INFORMATION SEAL
(FOR SAFETY)
ソフトウェア情報シール (安全装置用)



PAINT COLOR : NOTHING PAINT
塗装色 : 塗装無し

SURFACE TREATMENT : ZINC PLATING
表面処理 : (CHROMATE TREATMENT)

表面処理 : 亜鉛メッキ (クロメート処理)

NAME		D-CPU UNIT	
MATERIAL		(D-CPU-ME_7G)	
WRIGHT	1.6kg		
RELATION NO.	竹下		
CODE NO.	W3768318-01		
DWG. NO.	73768318-01		
SCALE	1:2		

Nabtesco Corporation

AC

制 訂	呼 び 寸 法 ミ メ リ	許 容 差	307コア120以下	0.3	表 面 ア ラ サ	V V V	6.3S	(1.6a)
リ	0.3以上 6以下	-0.1	1207コア315以下	-0.5	仕 上 記 号	V V	25S	(6.3a)
加 工	67コア 30以下	-0.2	3157コア1000以下	-0.8	▽ V V V	▽	100S	(25a)

CIT-MR-0

NOTE 2 : SCREWLESS TYPE TERMINAL BOARD
スクリューレスタイプ端子台

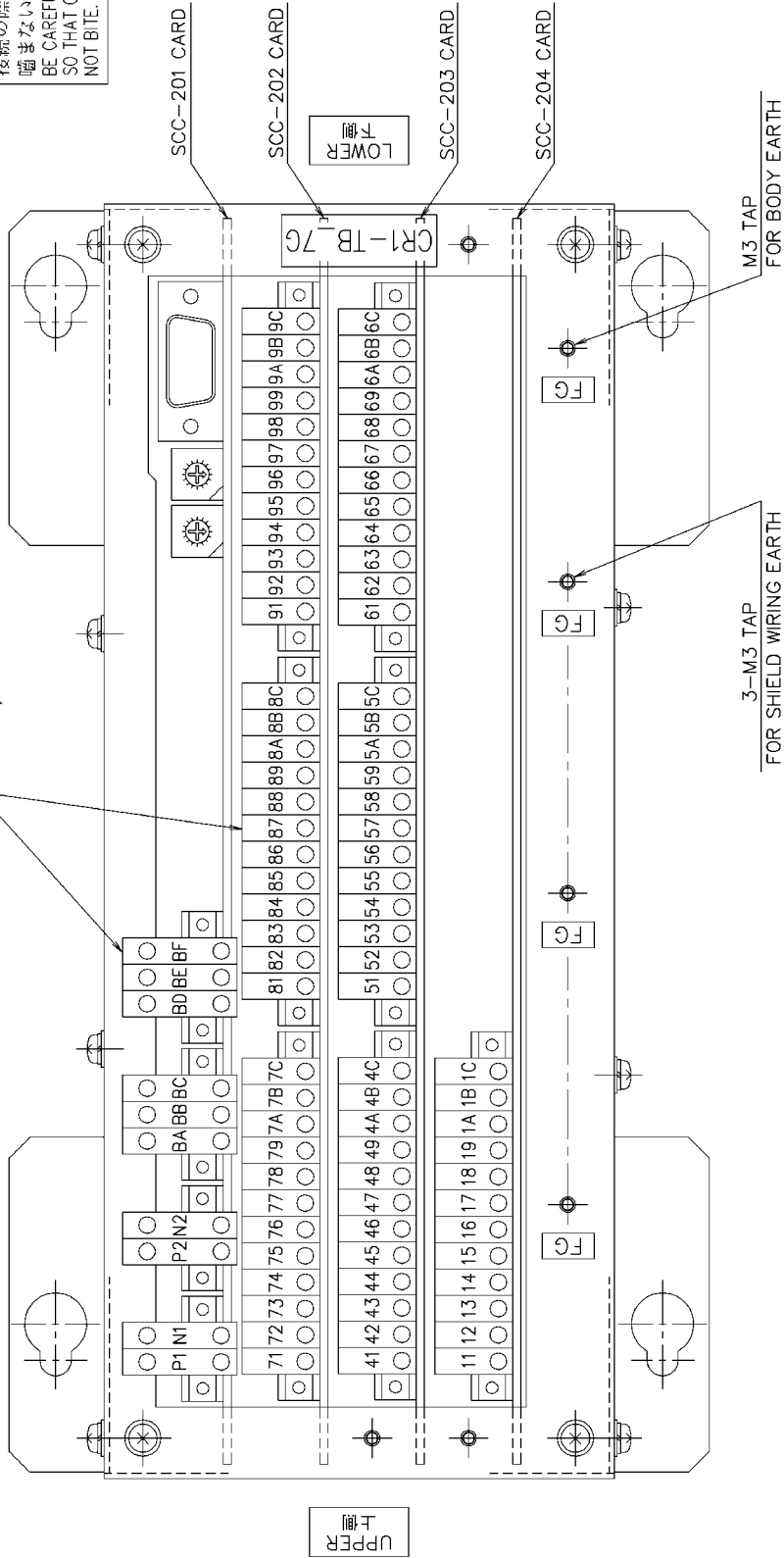
NOTE 3 : WIRES SIZE 0.2 ~ 2.5mm²
電線サイズ

接続の際は、配線の被覆が
噛まない様に注意願います。
BE CAREFUL OF THE CONNECTING
SO THAT CLOTHING OF WIRE DOES
NOT BITE.


10mm

TERMINAL BOARD

NOTE 2 / NOTE 3



TERMINAL BOARD ARRANGEMENT

端子台配列図

NAME										CR1-TB UNIT									
MATERIAL										(CR1-TB-R1A11_7C)									
WEIGHT																			
RELATION NO.																			
SCALE										1 : 1									
REV. MARK																			
DATE																			
DESIGNED																			
CHK. APVD.																			
CODE NO.										73768319-01									
DWG. NO.										2/2									

制 リ 加	呼び寸法 0.3以上 6以下 6.7未満 30以下	許容差 +0.1 -0.2	307未満 120未満 315未満 1000以下	0.3 0.5 0.8	片面 上下 両面	アラサ Rmax (Ra)	V V V V V ▽	6.3S 25S 100S	(1.6a) (6.3a) (25a)
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CIT-MR-0

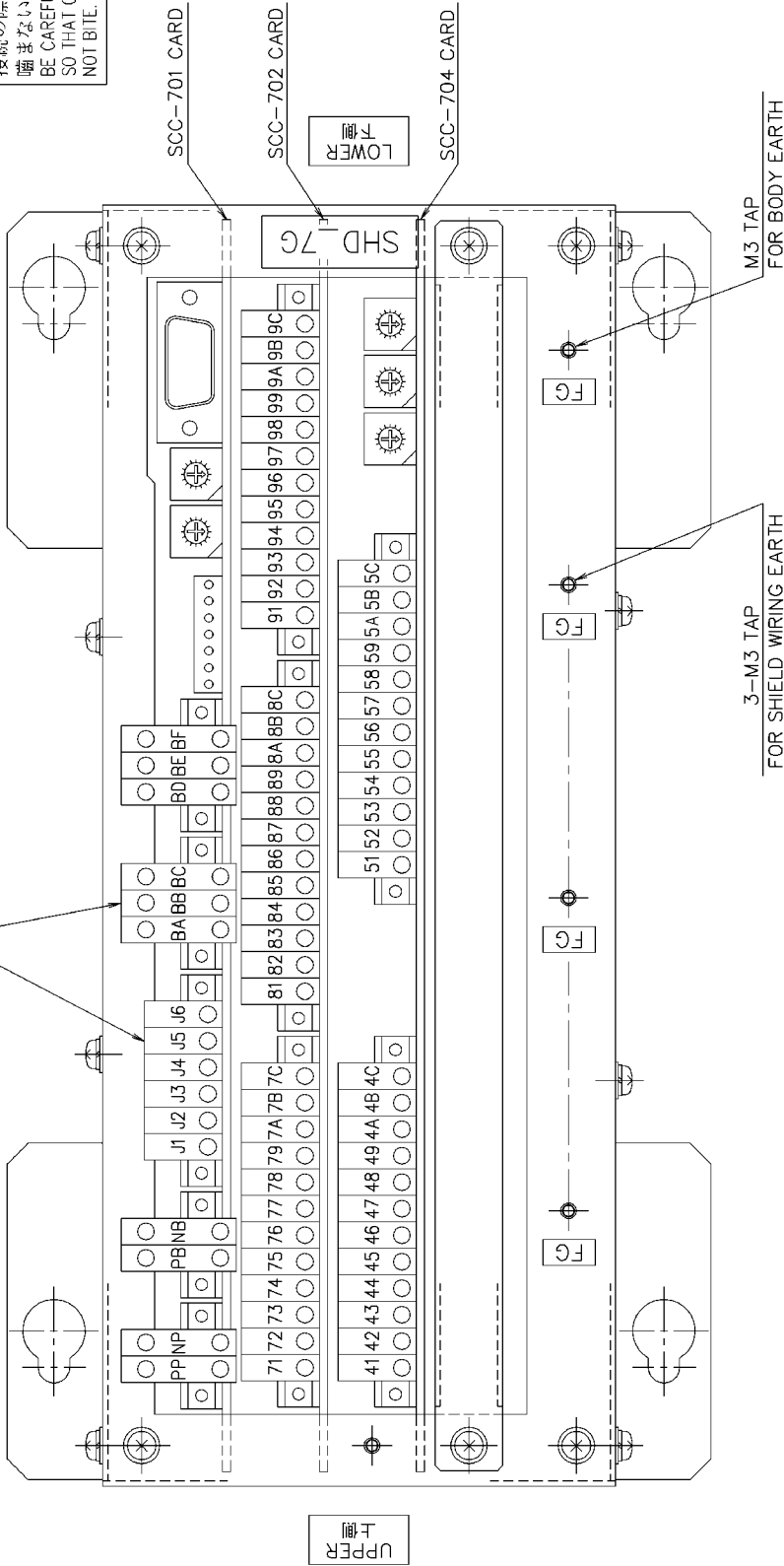
NOTE 2 : SCREWLESS TYPE TERMINAL BOARD
スクルーレスタイプ端子台

NOTE 3 : WIRES SIZE 0.2 ~ 2.5mm²
電線サイズ

10mm

接続の際には、配線の被覆が
噛まない様に注意願います。
BE CAREFUL OF THE CONNECTING
SO THAT CLOTHING OF WIRE DOES
NOT BITE.

NP-A



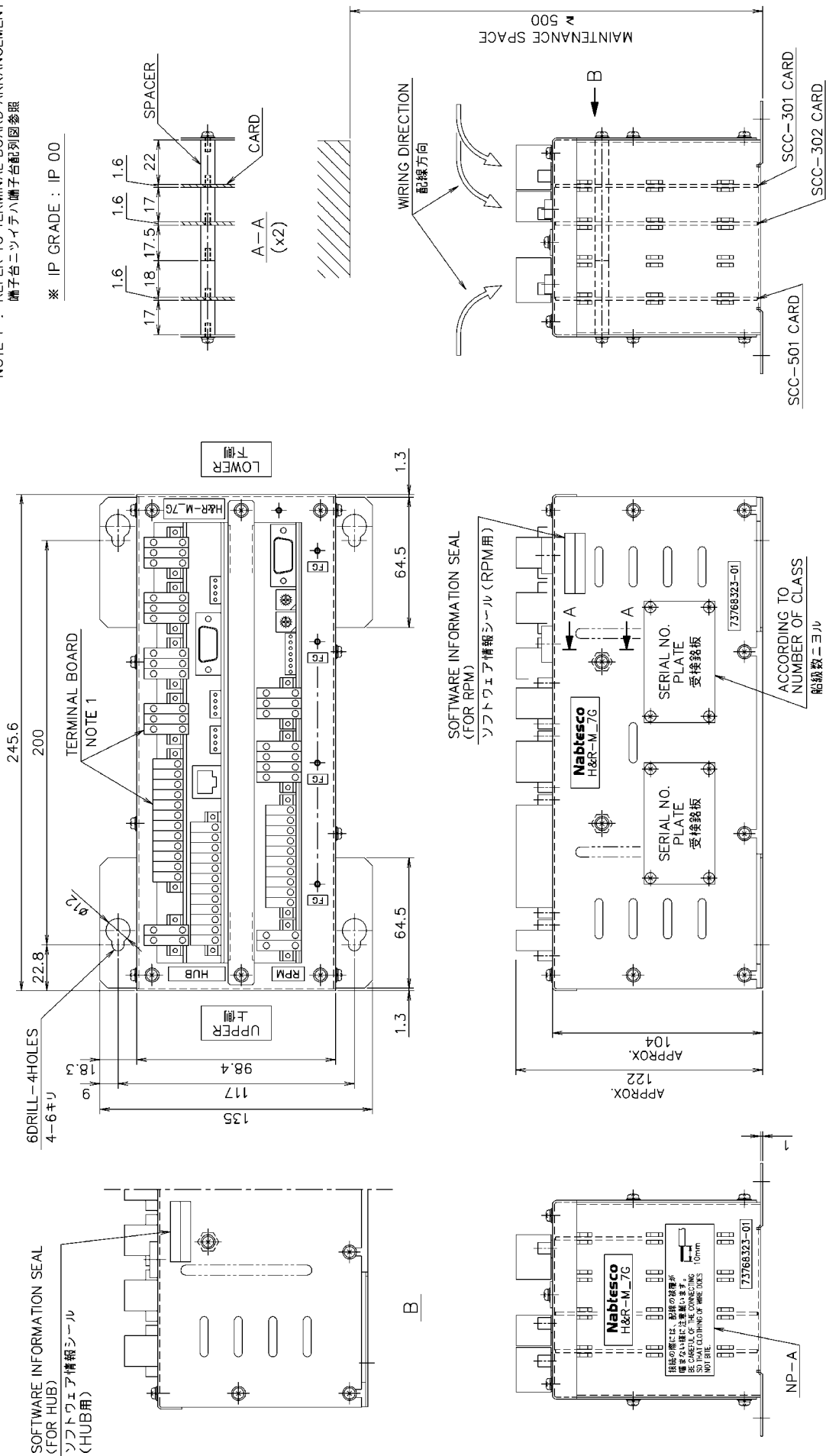
TERMINAL BOARD ARRANGEMENT
端子台配列図

										MATERIAL	NAME	SHD UNIT	
										WEIGHT		(SHD-10_7G)	
										RELATION NO.		CODE NO.	DWG. NO.
										SCALE	1 : 1		73768322-02 2/2

制 リ 寸	呼び寸法メ分	許容差	307コア120以下	0.3	片面アラサ	V V V	6.3S	(1.6a)
	0.5以上 6以下	-0.1	1207コア315以下	-0.5	仕上出分 Rmax	V V	25S	(6.3a)
	67コア 30以下	-0.2	3157コア1000以下	-0.8	V V V V	▽	100S	(25a)

NOTE 1 : REFER TO TERMINAL BOARD ARRANGEMENT
端子台ニツイテハ端子台配列図参照

※ IP GRADE : IP 00



PAINT COLOR : NOTHING PAINT
塗装色 : 塗装無し

SURFACE TREATMENT : ZINC PLATING (CHROMATE TREATMENT)
表面処理 : 亜鉛メッキ(クロメート処理)

MATERIAL		NAME	
WRIGHT 1.5kg		H&R-M UNIT	
RELATION NO. W3768323-01		(HUB & RPM_7G-MAIN)	
SCALE 1:2		CODE NO. DWG. NO. 73768323-01 1/2	
REV. MARK	NOTE	DATE	DESIGNED CHK. APVD.
		2021 5/6	小川 博原

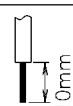
項目	呼び寸法区分	許容差	307コア=120以下	0.3	片面アラサ	V V V	6.3S	(1.6a)
リ	0.3以上 6以下	-0.1	1207コア=315以下	-0.5	仕上寸分 Rmax	V V	25S	(6.3a)
リ	67コア=30以下	-0.2	3157コア=1000以下	-0.8	▽▽▽▽	▽	100S	(25a)

CIT-MR-0

NOTE 2 : SCREWLESS TYPE TERMINAL BOARD
スクルーレスタイプ端子台

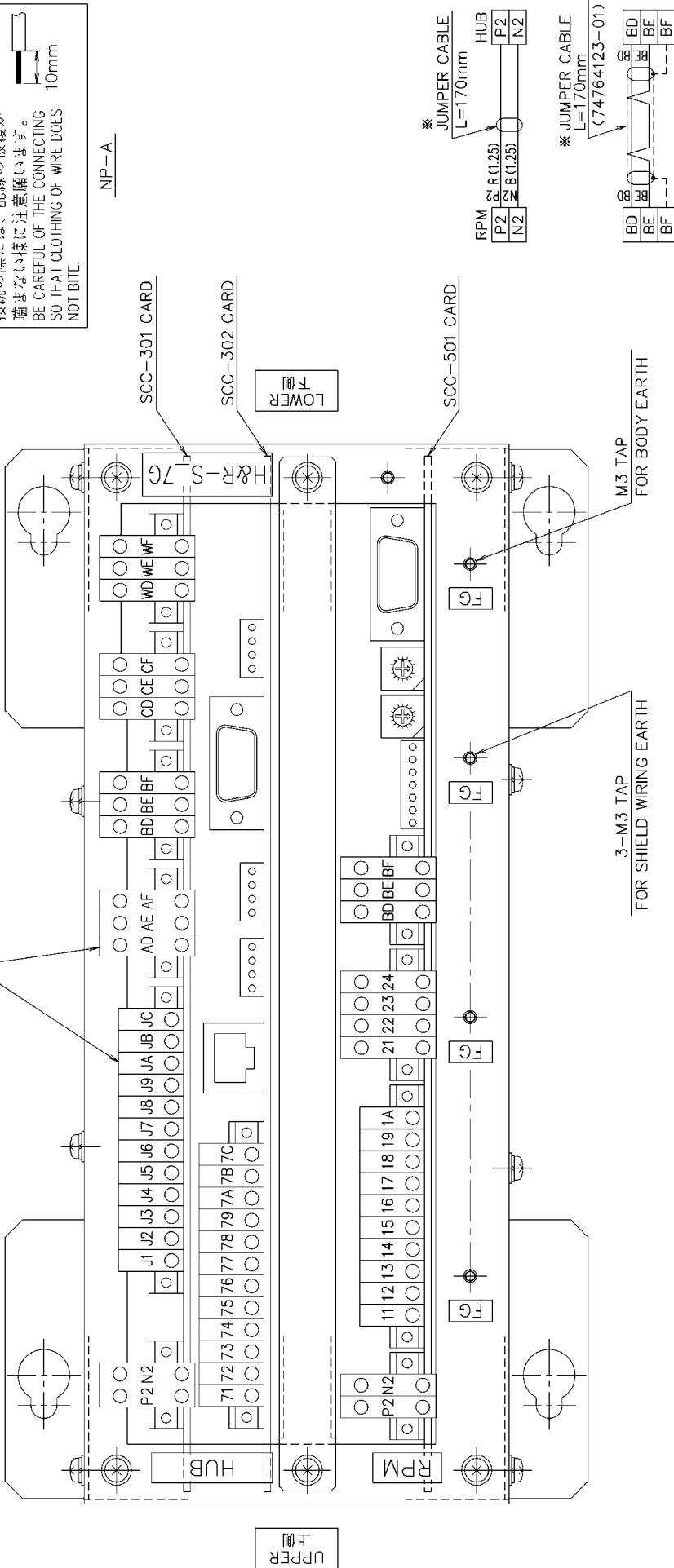
NOTE 3 : WIRES SIZE 0.2 ~ 2.5mm²
電線サイズ

接続の際には、配線の被覆が
噛まない様に注意願います。
BE CAREFUL OF THE CONNECTING
SO THAT CLOTHING OF WIRE DOES
NOT BITE.



NP-A

TERMINAL BOARD
NOTE 2 / NOTE 3



TERMINAL BOARD ARRANGEMENT
端子台配列図

WIRING DIAGRAM

* : SUPPLIED BY NABTESCO
(PLEASE REFER TO W3768323-51)

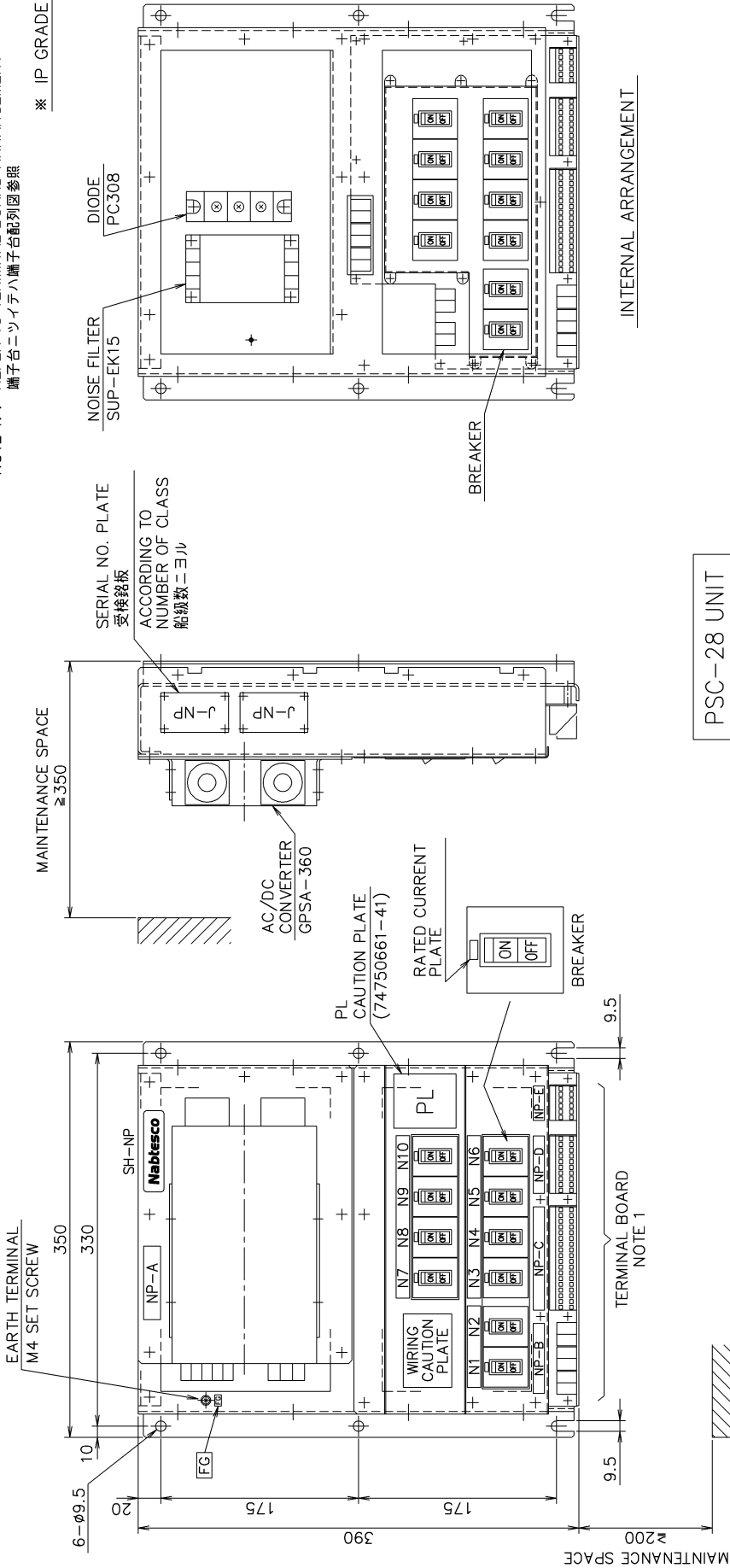
NAME										H&R-S UNIT									
MATERIAL										(HUB & RPM_7G-SUB)									
WEIGHT																			
RELATION NO.																			
DESIGNED																			
DATE																			
NOTE																			
REV. MARK																			
SCALE										1 : 1									
CODE NO.										73768323-51									
DWG. NO.										2/2									

判別加工	呼び寸法区分	許容差	30アコース120以下	±0.3	表面アラサ	▽▽▽	6.3S	(1.6a)
	0.5以上 6以下	±0.1	120アコース15以下	±0.5	仕上記号 Rmax	▽▽	25S	(6.3a)
	6アコース 30以下	±0.2	315アコース1000以下	±0.8	▽▽▽▽ 0.8S	▽	100S	(25a)

CIT-MR-0

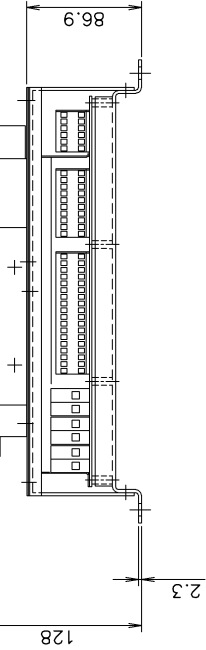
NOTE 1.: REFER TO TERMINAL BOARD ARRANGEMENT
端子台ニツイテハ端子台配列図参照

※ IP GRADE : IP 00



PSC-28 UNIT
NP-A
NAME PLATE

CONTROL SOURCE	SAFETY SOURCE	E/S OUT "A" SOURCE	E/S OUT "B" SOURCE
N7	N8	N9	N10



PAINT COLOR :NOTHING PAINT
塗装色 : 塗装無し
SURFACE TREATMENT :ZINC PLATING
表面処理 : (CHROMATE TREATMENT)
亜鉛メッキ(クロメート処理)

INTERNAL ARRANGEMENT

MAIN SOURCE (AC)	EMERG. SOURCE (DC)
N1	N2

C/R OUT "A" SOURCE	C/R OUT "B" SOURCE	SHD BACKUP SOURCE	GOVERNOR SOURCE
N3	N4	N5	N6

NAME		PSC-28 UNIT	
MATERIAL	WEIGHT	RELATION NO.	CODE NO.
	9.5kg		
種原	T.S	高杉	73768789-01
—	M: 73763648-01 SPC 22.04.22	2022 —	4/22
REV. MARK	NOTE	DATE	DESIGNED
			CHK. APVD.
			SCALE
			1 : 4
			DWG. NO.
			73768789-01
			1/2

Nabtesco Corporation

AC

判別	呼ば寸法区分	許容差	307mm以下	±0.3	表面アラサ	▽▽▽	6.3S	(1.6a)
リ	0.5以上 6以下	±0.1	1207mm以下	±0.5	仕上記号	▽▽	25S	(6.3a)
加	67mm 30以下	±0.2	3157mm以下	±0.8	▽▽▽▽	▽	100S	(25a)

CIT-MR-0

NOTE 2. : SCREWLESS TYPE TERMINAL BOARD
スクルーレスタイプ端子台

CAUTION

Voltage.
May cause
electric shock.

• Turn off power before
checking or maintenance.
• Do not operate with door
and protective cover open.

BE CAREFUL OF THE CONNECTING
SO THAT CLOTHING OF WIRE DOES
NOT BITE.

10mm
FOR TERMINAL NO.
A1, A2, CA1, CA2,
CP, CN

7mm
OTHER
TERMINALS

WIRING
CAUTION PLATE

PL
CAUTION PLATE
(74750661-41)

PHOENIX CONTACT
MKDSP-10 (6P)
(WIRES SIZE 0.5-16mm²)

A1	A2	CA1	CA2	CP	CN
----	----	-----	-----	----	----

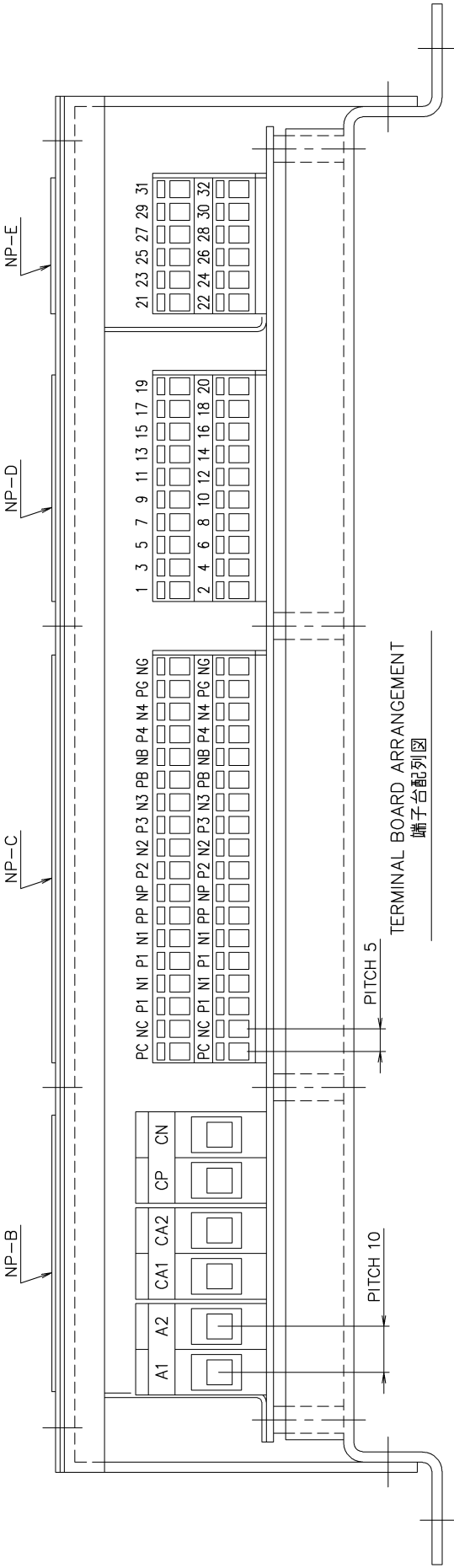
PHOENIX CONTACT
ZFKKDS 2.5-5,08 (34P)
(WIRES SIZE 0.2-2.5mm²)

PC NC	P1 N1	P1 N1	PP NP	P2 N2	P3 N3	PB NB	P4 N4	PG NG
PC NC	P1 N1	P1 N1	PP NP	P2 N2	P3 N3	PB NB	P4 N4	PG NG

1	3	5	7	9	11	13	15	17	19
2	4	6	8	10	12	14	16	18	20

21	23	25	27	29	31
22	24	26	28	30	32

NOTE 2.



TERMINAL BOARD ARRANGEMENT
端子台配列図

NAME										PSC-28 UNIT									
MATERIAL										DWG. NO.									
WEIGHT										CODE NO.									
RELATION NO.										73768789-01									
SCALE										2/2									
DATE										DESIGNED									
NOTE										CHK. APVD.									
REV. MARK										SCALE									
1 : 1																			

項目	呼び寸法区分	許容差	307コア	120以下	0.3	表面アラサ	▽▽▽	6.3S	(1.6a)
リ	0.5以上 6以下	-0.1	1207コア	315以下	-0.5	仕上記号 Rmax	▽▽	25S	(6.3a)
リ	67コア 30以下	-0.2	3157コア	1000以下	-0.8	▽▽▽▽ 0.8S	▽	100S	(25a)

CIT-MR-0

NOTE 2 : SCREWLESS TYPE TERMINAL BOARD
スクルーレスタイプ端子台

NOTE 3 : WIRES SIZE 0.2 ~ 2.5mm²
電線サイズ

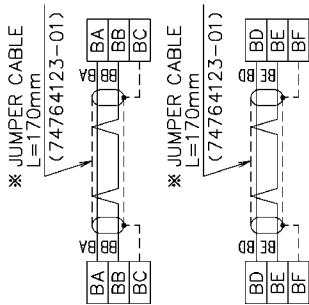
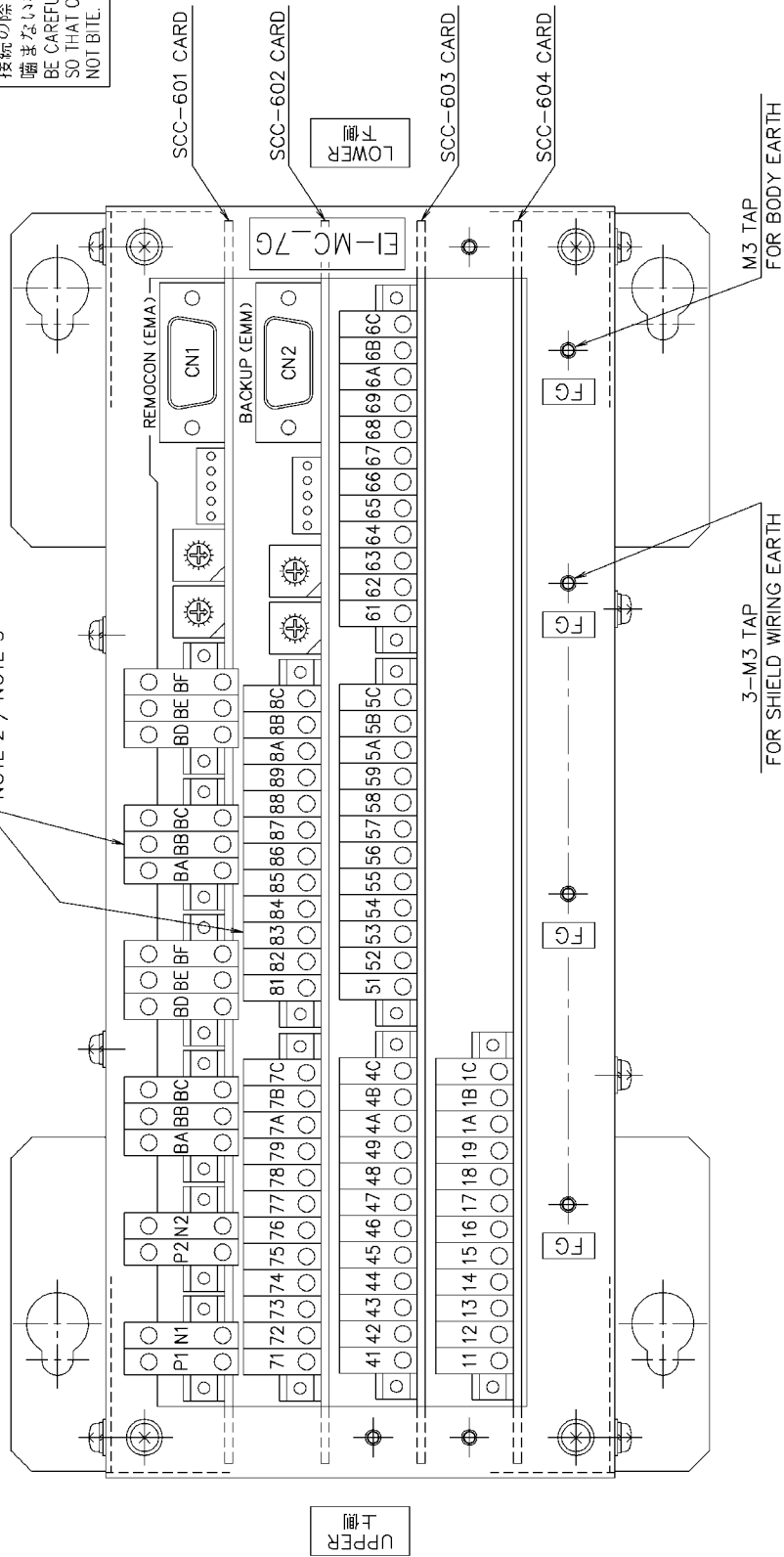
接続の際には、配線の被覆が
噛まない様に注意願います。
BE CAREFUL OF THE CONNECTING
SO THAT CLOTHING OF WIRE DOES
NOT BITE.



10mm

TERMINAL BOARD

NOTE 2 / NOTE 3



WIRING DIAGRAM

TERMINAL BOARD ARRANGEMENT

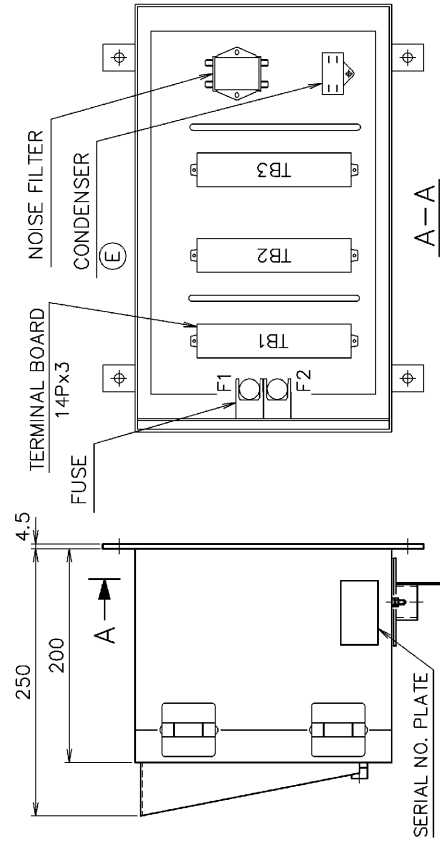
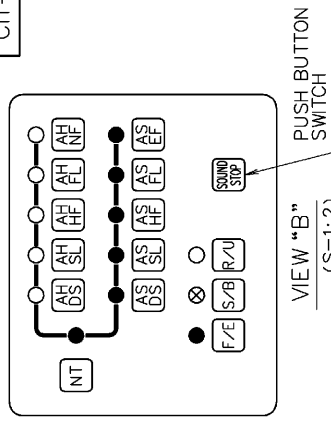
端子台配列図

* : SUPPLIED BY NABTESCO
(PLEASE REFER TO W3768324-52)

NAME									
E1-MC UNIT									
(E1-MC_7G)									
(FOR ME-B WITH C/R BACKUP)									
DWG. NO.									
73768324-52 2/2									
CODE NO.									
SCALE									
1 : 1									
REV. MARK									
DATE									
DESIGNED CHK. APVD.									
NOTE									
MATERIAL									
WEIGHT									
RELATION NO.									

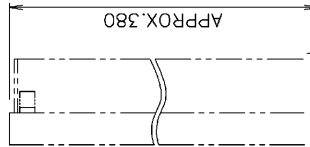
判別加工	呼び寸法区分	許容差	307mm以下	307mm~1200以下	±0.3	表面アラサ	▽▽▽	6.3S	(1.6a)
0.5以下	±0.1	1207mm~315以下	±0.5	仕上記号	Rmax	(Ra)	▽▽	2.5S	(6.3a)
67mm以下	±0.2	3157mm~1000以下	±0.8S	▽▽▽▽	(0.2a)		▽	100S	(25a)

CIT-MR-0



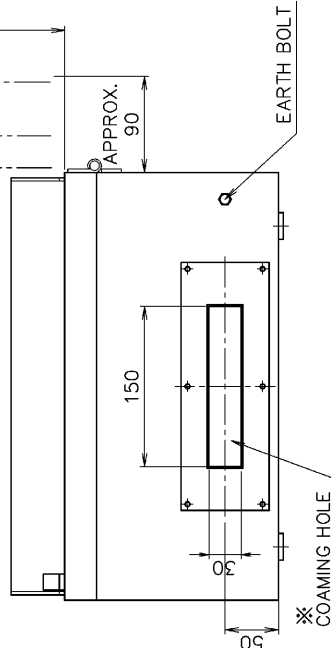
- LIGHT EMITTING DIODE (GREEN)
- LIGHT EMITTING DIODE (RED)
- ⊗ LIGHT EMITTING DIODE (YELLOW)
- ⊙ PUSH BUTTON SWITCH (MOMENTARY TYPE)
- ILLUMINATED PUSH BUTTON SWITCH (ALTERNATE TYPE, WITH COVER)
- INDICATOR LAMP

A



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

TB1~TB3
TERMINAL BOARD
ARRANGEMENT



- L21 : フラッシュベゼル, 正方形型 (□22)
- L10 : 表示灯 (AC100V)

※ AFTER WIRING, PUTTY IN THE COAMING HOLE.
配線後ハコミングホールラバワックスを充填。

◎ : ENGINE MAKER SUPPLY

N12	ROCKER ARM LUB OIL PUMP	—	BLACK	15x50
N11	CONTROL POSITION (PULL TURN)	—	BLACK	15x50
N10	LAMP TEST	—	BLACK	10x50
N9	C/R HANDLE NEUT	L9	BLACK	10x30
N8	TURNING GEAR ENGAGED	L8	BLACK	10x30
N7	TURNING GEAR DISENGAGED	L7	BLACK	10x30
N6	CLUTCH ASTERN	L6	BLACK	10x30
N5	CLUTCH NEUT	L5	BLACK	10x30
N4	CLUTCH AHEAD	L4	BLACK	10x30
N3	ENGINE SIDE	L3	BLACK	10x30
N2	CONTROL ROOM	L2	BLACK	10x30
N1	WHEEL HOUSE	L1	BLACK	10x30
N.	NAME PLATE LETTERING	L	LETTER, COLOR	SIZE

SW- RLP	STOP	RUN	BLACK	BN
SW- CPE	E/S	REMOTE	BLACK	BN
SW NO.	NAME PLATE LETTERING	LETTER, TYPE OR COLOR SIZE		

L21 PB-ESE	MANUAL EMERG. STOP	RED	BLACK
L10	RUN	GREEN	BLACK
L. NO.	LAMP LETTERING	FILTER COLOR	LETTER, COLOR

NAME		E/S INDICATOR BOX	
MATERIAL			
WEIGHT			
RELATION NO.		竹下	
ZHEJIANG ZHEN XING		2506	
SCALE		1:5	
REV. MARK	NOTE	DATE	DESIGNED CHK. AMD
—	M: 73095957-01	2023 7/3	S.F. — K.T
DWG. NO.		73104796-01	

Nabtesco Corporation

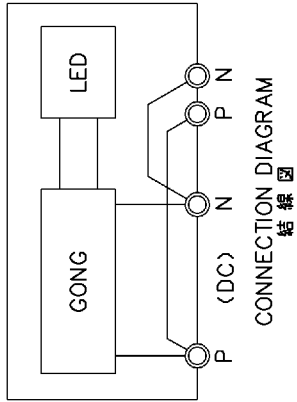
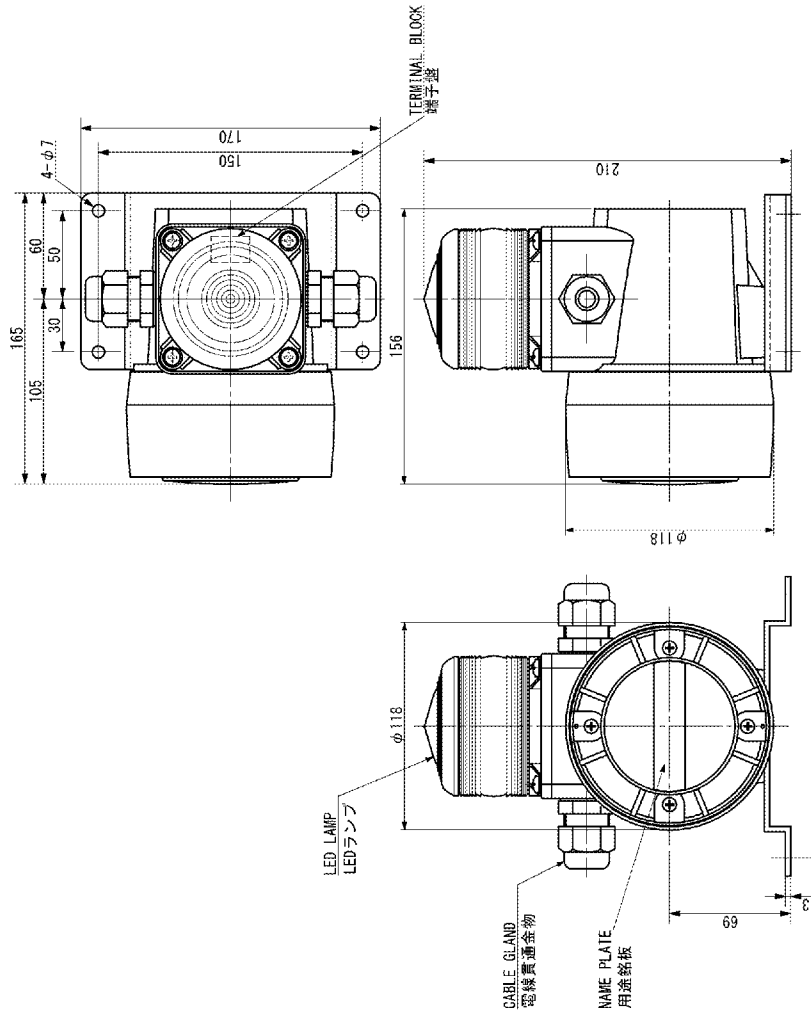
AC

前 リ 用 上	呼び寸法区分	許容差	表面アラサ-	▽▽▽ (1.6a)	6.3S (1.6a)
0.5以上	6以下	-0.1	Rmax (1Ra)	▽▽	25S (6.3a)
6以下	30以下	±0.2	▽▽▽▽ (0.2a)	▽	100S (25a)

CIT-MR-0

SPECIFICATION 仕様

TYPE	型式	EG30-LL
SOURCE	電源	DC24V
CURRENT	電流	290mA
PROTECTION GRADE	保護等級	IP 56
SOUND LEVEL	音圧レベル	Above 110dB/1m



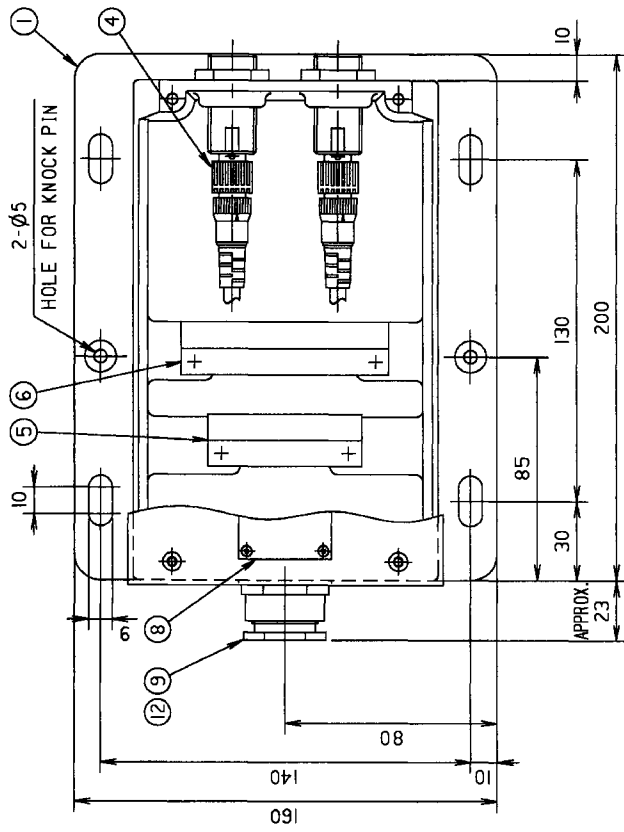
TELEGRAPH	AMBER アンバー	APPROX. 1250 Hz 約	GONG (220/min)	20	φ8~φ14	FG21L-14B	WHITE (MAKER STANDARD) 白 (メーカー標準)
NAME PLATE 用途銘板	GLOBE COLOR グローブ色	FUNDAMENTAL FREQUENCY 基本周波数	SOUND PATTERN 音色	CORD 呼び	CABLE SIZE ケーブルサイズ	MODEL 型式	COLOR 色
							REMARKS 記 事

NAME				EG30-LL ELECTRONIC GONG WITH LED LAMP 電子ゴング LED表示灯付			
MATERIAL				1.6Kg			
WEIGHT				RELATION NO.			
REV. MARK				DATE			
IBUKI KOGYO M: 74767588-01 SPC: 2022.01.06				2022 1/6			
DESIGNED				CHK. APVD.			
間嶋				榊原			
竹下				SCALE			
λ				CODE NO.			
DWG. NO.				74767588-11			

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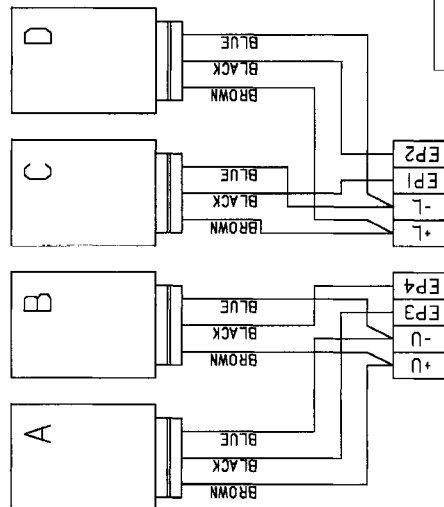
AC

呼称寸法の区分	許容差	30mm以下	30.1mm以上	60mm以下	60.1mm以上	120mm以下	120.1mm以上	表面アラサ	VVV	6.35	1.6a
加工	0.5以上	6mm以下	0.1	120mm以下	0.5	4mm以下	0.5	Rmax	VV	255	6.3a
加工	5mm以下	30mm以下	0.2	315mm以下	0.8	VVVV	0.85	0.2a	V	1005	25a



NOTE
注記

COLOR : MUNSELL (MAKER STANDARD)
。塗色 : マンセルN4.0 (メーカー標準色)



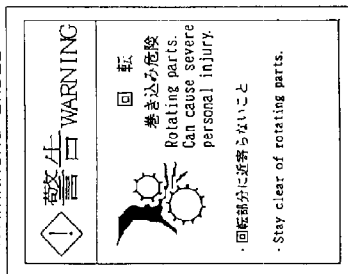
WIRING
配線

Q'TY OF SERIAL NO. P. 受検銘板ノ数
1

⑩ ※ NAME PLATE

PULSE GENERATOR
FOR M/E CONTROL

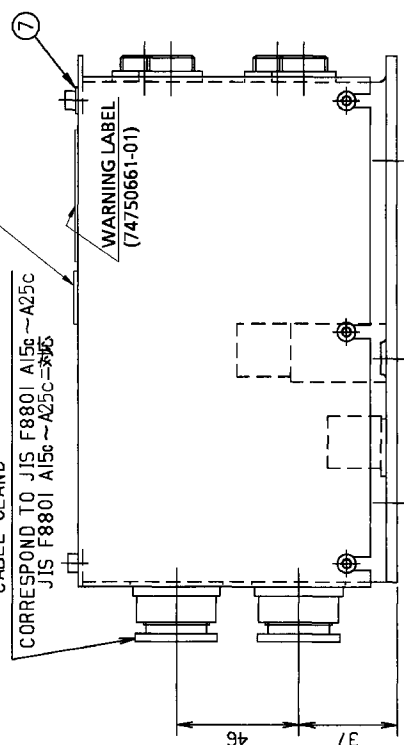
※ WARNING LABEL



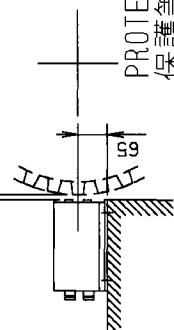
CABLE GLAND

CORRESPOND TO JIS F8801 A15c~A25c
JIS F8801 A15c~A25c=3φ5

WARNING LABEL
(74750661-01)



3.0±0.2mm



PROTECTION
保護等級 : IP44

g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
742H44585-01	2022	6/23	Y.K	桐山	小林	竹下	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山
IP等級追記	2010	3/31	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山
30a→25c訂正	2009	7/30	KTG	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山
ボルト変更	2009	6/25	TYG	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山
ボルト変更	2004	7.8	T.Y	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山
LABEL図追加	2004	7.8	T.Y	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山

g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
742H44585-01	2022	6/23	Y.K	桐山	小林	竹下	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山
IP等級追記	2010	3/31	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山
30a→25c訂正	2009	7/30	KTG	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山
ボルト変更	2009	6/25	TYG	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山
ボルト変更	2004	7.8	T.Y	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山
LABEL図追加	2004	7.8	T.Y	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山	桐山

NAME	MATERIAL	WEIGHT	RELATION NO.	SCALE	DESIGNED	DATE	NOTE	REV.	MARK
PG-40A PULSE GENERATOR パルスジェネレータ		2.4kg		1:2					
CODE NO.	727	DWG. NO.	73750626-01						

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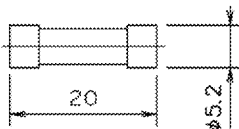
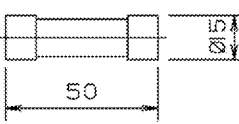
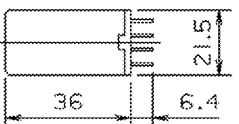
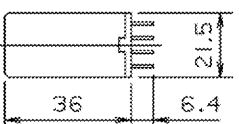
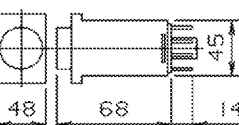
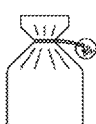
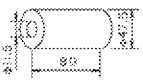
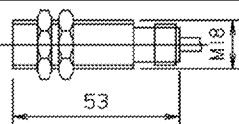
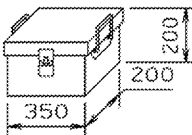
Nabtesco

SPARE PARTS LIST 予 備 品 表				SPEC. NO.		7SH71691-01	
NAME M/E REMOTE CONTROL SYSTEM				BOX. NO.			
<p>SHIPYARD : ZHEJIANG ZHENXING SHIPBUILDING & REPAIR CO., LTD.</p> <p>SHIP NO. : 2306</p> <p>MAIN ENGINE : AKASAKA A41S (E.NO.2022)</p>							
<p align="center">Nabtesco Corporation MARINE CONTROL SYSTEMS COMPANY DESIGN DEPARTMENT</p>							
			2023 7/3	高杉	竹村	三木	竹下
REV. MARK	NOTE	-	DATE	DESIGNED	CHK	APVD.	

ADDRESS:

1617-1, Fukuyoshi-dai 1-chome, Nishi-ku, Kobe, 651-2413, Japan

Phone No. Kobe +81-78-967-5361 Fax. No. Kobe +81-78-967-5362

SPARE PARTS LIST 予 備 品 表				SPEC. NO.		7SH71691-01		
NAME M/E REMOTE CONTROL SYSTEM				BOX. NO.				
NO. 項目	DESCRIPTION 品 名	OUTLINE 外 形 図	PC. NO. 品 番	個数 Q'TY			REMARKS 記 事	REV. 改正
				WORKING		SPARE		
				PER SET	PER SHIP			
1	FUSE 5A		74755815-07		1	1	0.1kg FUJI TANSI	
2	FUSE UC1 5A		74738264-03		4	4	UTSUNOMIYA	
3	AUX. RELAY MY4		74730800-03		1	1	OMRON DC24V	
4	AUX. RELAY MY4		74730800-05		5	1	OMRON AC100V	
5	TIMER H3CR-A		74748071-02		1	1	OMRON AC100V	
6	REPAIR KIT FOR TELEG. LOGGER ML-800-Ⅲ/ML-800-V		74Y59202-10		—	1	 74744800-01 THERMO SENSITIVE PAPER×5/SET	
7	PROXIMITY SW. E2E-X5E1-M1 E2E-X5C118-M1		73750629-01		4	1	OMRON	
8								
9								
10	SPARE PARTS BOX		74591419-31		—	1	5.2kg	

ADDRESS:

1617-1, Fukuyoshi-dai 1-chome, Nishi-ku, Kobe, 651-2413, Japan
 Phone No. Kobe +81-78-967-5361 Fax. No. Kobe +81-78-967-5362

Nabtesco

Handling manual of **Nabtesco** Control equipment

1. Installation

- 1) Take care that foreign matters or dust should not come in each equipment and pipe. Without fail clean pipes with compressed air of 0.5 to 0.7 MPa before connection.
- 2) Use the pipes specified in the circuit diagram.
- 3) In case of piping by brazing or welding, take care that the passage or pipes are not narrowed or blocked by molten metal.
- 4) Arrange each equipment so that the length of pipes can be shortened.
- 5) Use the cable specified in the electric circuit diagram.
- 6) Install the electric equipment where there is less vibration.
- 7) After finishing the piping with blowing air, supply compressed air of 0.7 MPa and check the air leakage at the connecting portion with soapsuds.

2. Application

- 1) Do not touch the red-painted portion except unavoidable cases, since it is fully adjusted by Nabtesco.
- 2) Drain the filter or the tank once a day.
- 3) In regard to filters or strainers, overhaul the filter elements within one month after application. Replace dirty vinyl sponge elements with new ones. Overhaul the filter of main line regularly once a month.
- 4) In regard to other pneumatic equipment, only regular inspection is required.
The period of regular inspection depends on the environment and the frequency (Refer to the following)
 - Equipment for 1.0 MPa installed in Bridge or Engine Room
(Under good condition of dry and clean air) ... every five years
 - Change-over valves for high pressure
(3.0 MPa) every two years
 - Devices installed on deck Once a year or every two years
(according to environmental conditions)
- 5) Make regular inspection referring to the drawing and manual of each equipment. Replace damaged parts with new ones. Apply good grease to the sliding portion and reassemble them. (Recommended grease: COSMO OIL Dynamax No. 2, etc.) Replace main rubber parts such as valve seat, diaphragm, and sliding packing with new once five years. Replace rubber parts for gasket seal of stopping portion once six to eight years.
- 6) The variation of power source voltage should be in $\pm 10\%$ of rating. In case of the application charging 24V battery, take care not to exceed 27V.
- 7) We are not using any asbestos for the components of these drawings.

Nabtesco 制御機器・装置取扱説明

1. 艀装上の注意事項

- (1) 配管工事の際、各機器および管内に塵や異物が入らないよう注意し、必ず接続の前に管内を圧力空気 (0.5~0.7MPa) で十分吹かし清浄してください。
- (2) 配管は、回路図中に指定されたものを使用してください。
- (3) ロー付または溶接配管をする場合は接続箇所の通路が絞られないよう、また、ロー等が管内に流入し管がつまるようなことがないように十分に注意してください。
- (4) 配管の長さとはできるだけ短かくするよう機器の配置を考えてください。
- (5) 電気配線はできるかぎり、盤間配線図に指示されたケーブルを使用してください。
- (6) 電気機器はできるだけ振動の少ない場所に取付けるようにしてください。
- (7) エアー吹かしを行ない配管が全て完了してから 0.7MPa の空気を供給し、配管の接続箇所から空気の漏れがないか石鹼水にてチェックしてください。

2. 使用上の注意事項

- (1) 赤ペンを塗って封印した箇所は Nabtesco にて十分調整検査した箇所ですからできるだけさわらないようにしてください。
- (2) フィルターおよびタンクに溜まるドレンは、1日1回ぬいてください。
- (3) 塵コシ類は使用開始後1ヵ月以内に、分解してフィルターエレメントの清掃を行ってください。ビニールスポンジエレメントで汚れのひどいものは新品と交換してください。メインラインの塵コシはその後毎月1回程度定期的に分解清掃を行って下さい。
- (4) 他の空気圧機器は定期点検以外特に点検を必要としません。定期点検の時期は使用環境、作用頻度を勘案し下期推奨基準を参考として決定してください。
 - 船橋または機関室設置の 1.0MPa 用機器
乾燥清浄空気を使用するなど好条件の場合 5年に1度
 - 高圧用 (3.0MPa) 切換弁類 2年に1度
 - 暴露甲板上に設置された機器 1年に1度もしくは2年に1度 (環境に応じて決定)
- (5) 定期点検は各機器の図面及び説明書参照の上分解洗浄し損傷部品は新品と取替え、摺動部に良質のグリースを塗布して再組立してください。(推奨グリース コスモ石油ダイナマックス No. 2 相当品)
バルブシート、膜板、摺動パッキン等重要なゴム部品は5年に1度、静止部品のガスケットシール用ゴム部品は6~8年に1度新品と取り替えるようにしてください。
- (6) 電源電圧の変動は定格の $\pm 10\%$ 以内に必ず押えてください。24Vバッテリーを充電しながら使用する場合も絶対に27Vを超えないよう注意してください。
- (7) 本図書に於ける機器には一切のアスベストは使用されていません。

Nabtesco Corporation

ナブテスコ株式会社

Marine Control Systems Company

船用カンパニー

Kobe Office	1617-1 Fukuyoshi-dai 1-chome, Nishi-ku, Kobe, 651-2413, Japan Phone No. Kobe +81-78-967-5361 Fax. No. Kobe +81-78-967-5362	神戸営業	〒651-2413 神戸市西区福吉台 1 丁目 1617 番地 - 1 TEL (078) 967-5361 FAX (078) 967-5362
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Tokyo Office	JA Kyosai Bldg, 7-9, Hirakawa-cho 2-chome, Chiyoda-ku, Tokyo, 102-0093, Japan Phone No. Tokyo +81-3-5213-1155 Fax. No. Tokyo +81-3-5213-1173	東京営業	〒102-0093 東京都千代田区平河町2丁目7番9号 JA 共済ビル TEL (03) 5213-1155 FAX (03) 5213-1173
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Seishin Factory	1617-1 Fukuyoshi-dai 1-chome, Nishi-ku, Kobe, 651-2413, Japan Phone No. Kobe +81-78-967-1401 Kobe +81-78-967-7322 Kobe +81-78-967-1404 Fax. No. Kobe +81-78-967-1279 Kobe +81-78-967-4868 Kobe +81-78-967-4891	西神戸工場	〒651-2413 神戸市西区福吉台 1 丁目 1617 番地 - 1 TEL (078) 967-1401 (078) 967-7322 (078) 967-1401 FAX (078) 967-1279 (078) 967-4868 (078) 967-4891	工場設計サービス (アフターサービス) 工場設計サービス (アフターサービス)
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