CDY Type Marine Main Set Electrical Remote Control System Service Instruction

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Content

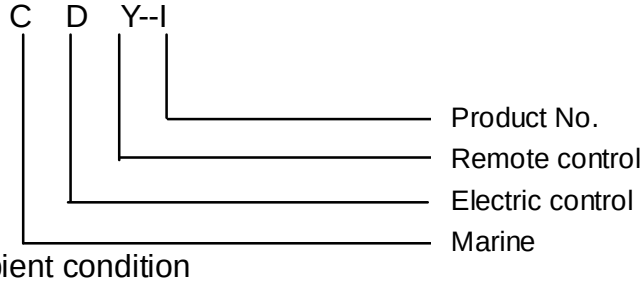
1. General

1.1 Product's characteristicThis system is electric control system ,its core unit resorts OMS Series digital Integrated circuit and PID control technique, components and parts as precision potentiometer , photoelectric coupler , electric current transport module etc. are adopted to realize starting command in wheel house, speed governing and reversing of program which are processed by main engine speed governor and driven by electric control main panel(driving panel)driving motion follow-up performer, product's structure is simple and reasonable, and its function is complete, via check of China Marine Industry Wuhan Electromechanical Products Circumstance and Reliability Test Check Centre, it is the ideal marine main set remote control system for the moment .

1.2 Main application and scope of application:

This system is main set remote control system of electric-electric control form. It has complete functions as over limit, alarm, and a variety of interlock and protection, it may remote control Start-up(mounted according to user's needs), speed governing , Emergency stop of main engine and reversing of gear box in wheel house； also may use standby engine telegraph(matched with device)to transmitting command signal ,and manually control speed governing of main engine and reversing of gear box at local; besides may monitor running condition of main engine. This device is suitable for marine main propulsion system composed of electric control reversing gearbox and main engine as 135, 150 , 160 , 170 , 180 , 190 , 200 , 210 , 250 , 300 , 320 , 20 / 27 , 23 / 30 , 28 / 32 , M&M, MAN etc. as well as reversible main engine(8NVD、6L35O).

1.3 Type and meanings



1.4 Ambient condition

1.4.1 Temperature:-10℃～+55℃

1.4.2 Relative humidity : 95 % ± 3 %(Temperature is 40℃)

1.4.3 This system can incline and vibrate for 22.5℃ at each direction (time of swing is 10S),and may normally work when the linear acceleration at the vertical direction is ±9.8m/S 2

1.4.4 Protection grade:IP22

1.4.5 Under the circumstance that having salt mist, oil mist and mould fungus.

1.4.6 The device has favorable anti-interference ability .

1.5 Safety

This system conforms with the requirements and rules of "Steel seagoing vessel class and construction rules " (2006 Edition) , "Steel inland ship class and construction rules " (2002 Edition) and " Technical conditions of CDDY Type main

engine remote control unit "

2.Technical characteristic

2.1 Technical specification and Parameter

2.1.1Technical specification

a. Type: CDY-Ⅰ

b. Type:electric-electric control, single handle control type

c. Speed adjustable range :from minimal rotary speed to maximum rotary speed of main engine.

d. Precision of Speed governing :less than 4% of rated speed

e. Reversing time:4-15 seconds(rise time of pressure for gear box is included)

f. Main power supply:AC220V±15% ;
Standby power supply:DC24V+30% and -25%

g. Electric power consumption:<150W(single engine)

h. Insulation resistance:>1MΩ

2.2 Main performance

2.2.1 Speed governing of Program: speed governing system relays on maneuvering handle for controlling, may realize slow speedup—fast speed down, until the rotary speed is consistent with remote-control command .

2.2.2 Program reversing :logic action of reversing linkage system is controlled by dint Of electric main control panel, automatically realize Program reversing as “fast speed down —constant Speed disengagement—empty delay —constant Speed engagement—slow speedup ”,and coordinate with Program speed governing to complete ahead, astern command, unlikely reach the reversing mechanism of gear box synchronously.

2.2.3 Error direction linkage: when turning of propeller is incompatible with reversing command of remote control, System will automatically cut off the speedup signal, till the reversing to the right position.

2.2.4 Local manual control operation: When then remote control system fails, may manual control reversing of main engine and speed governing of gear box according to engine telegraph command.

2.2.5 Alarm: may send out overbuilt limit alarm for a variety of failures, Alarm loops are independent from each other, and won't interfered each other, audible and visible alarm is to be sent out when failure appears on each loop, and separately displayed in wheel house and engine room .

2.2.6 Test lamp: operate the test push down button, check whether all the indicating lamps are in good condition.

2.2.7 Dimmer: Operate the dimmer push button, adjust the brightness of constant indicating lamp .

2.2.8 Mute: Operate the mute push down button, remove the alarm signal and photo-signal is kept until the failure removed.

2.2.9 Emergency stop:operate "Emergency Stop" push button, main engine will

immediately shutdown,and accompanied with audible and visual alarm indication signal.

2.2.10 Emergency power supply: when the primary electric power loses voltage, DC 24V standby power supply will automatically input and alarm. After the primary source restores, standby power supply will automatically exit.

2.2.11 Fine adjustment for rotary speed(selected): crawl type corrective adjustment is to be done with rotary speed of each step on wheelhouse console.

3. External dimension of device: detailed dimension is to be referred to drawing CDY- I , CDY -II , CDY -III

4. Structure and operating principle(system diagram)

4.1 Structure: this system is divided into three parts: wheelhouse console , engine room control box and follow-up control box.

4.1.1 Wheelhouse console: mainly composed of Speed governing and reversing command, engine telegraph transmitting manipulator, indication panel for alarm communication, power section, electric control main panel and driving part etc.

4.1.2 Engine room control box: mainly composed of engine telegraph numerical display, monitoring alarm, amplificatory driving part and communication indication etc.

4.1.3 Follow-up control box: mainly composed of actuating motor, checking feedback line, connecting gear etc.

4.2 Operating principle

Operating principle of this system is integration of each related function unit, respectively specified as follows:

4.2.1 Speed governing of program

At the time of remote-controlled operation ,maneuvering handle will turn within the range of ahead or astern, it won't change the " engagement" signal for original ahead or astern of gear box, as well as linkage state of system. Manipulator will send out command signal ,actuating motor will begin turning after being subjected to comparative logic operation via electric control main panel,driving follow-up gear ,output mechanical displacement,manipulate throttle lever of speed governor for speedup or speed-down . when the rotary speed is consistent with speed governing command,this signal is to be fed back to electric control main panel in operating console by follow-up gear ,so as to keep this speed.

4.2.2 Program reversing

This device allows the maneuvering handle being pulled directly from the maximal step of ahead to astern step (won't burn-out when there is a large reversing) may automatically realize the following reversing functions:

Slow down: maneuvering handle is to be pulled from maximal step to

minimum step of ahead, resident program of main control panel will make the actuating motor turn, driving throttle lever of main engine fast speed down in the opposite direction .

Disengagement: maneuvering handle is to be pulled from minimum step of ahead to neutral step, ahead command disappears, and clutch is to be paced and disengaged via Interior program , main engine will enter idle speed state.

Empty: after ahead disengagement of clutch , ahead oil pressure signal of gear box disappears, ahead positioning indicating lamp on operating console goes out, whereas empty indicating lamp flashes, during delay disengagement of ahead to delay engagement of astern, setting program inside the device will cut off Speed governing circuit, so main engine can't accelerate.

Engagement: maneuvering handle is to be turned to astern position, and send out astern command,Interior setting program will make the clutch astern engaged, after astern engagement, astern positioning switch is to be pressed," empty" lamp on operating console goes out, and "astern" indicating lamp flashes. Meanwhile, switch on Speed governing circuit, allowing main engine to accelerate.

Speedup:Turn maneuvering handle under ahead and astern state, send out signal command for speedup of actuating motor along with accretion of handle 's displacement,

The program and reversing program for Maneuvering handle being transferred from astern step to maximal step of ahead is in a similar way.

5. Installation and debugging

5.1 Installation

a. Operating console is to be arranged in wheel house, monitoring box is to be installed in engine room.
b. Follow-up performer unit is to be installed near gun .
c. Precautions against earthquakes should be considered for installation of each part.

5.2 Debugging methods and matters need attention

5.2.1 Ordinary test: do this test after finishing installation.

a. Whether the wiring is firm, whether somewhere is loose.
b. Operating values for instrument and pressure switch are to be set as required;
c. Moving parts are to be subjected to manual examination check, they should act flexibly.

5.2.2 Functional check

This unit is to be input primary source, switch on power switch on operating console panel, power supply lamp flashes, expressing power is switched on .

5.2.2.1 Press test lamp push button, all indicating lamps on operating console panel should flash; press test lamp push button on monitoring box, all indicating lamps on its panel should flash.

5.2.2.2 Dimmer: rotate the dimmer push button, brightness of constant indicating lamp on operating console panel should have obvious change.

5.2.2.3 Mute: Press mute push button when an alarm is given, audible signal is to be removed.

5.2.2.4 SBE-FWE communication

a. Stand by engine: put "SBE-LOCAL" switch to " SBE" position,there should be audible signal both on operating console and engine room monitoring box," stand by engine " lamp on engine room monitoring box flashes, put " SBE-FWE" switch to" SBE" position ,audible signal disappears, “SBE" lamp on operating console flashes, expressing that engine room begin to standing by . Put "SBE-FWE" switch to “SBE" position, expressing that SBE has been finished.

b. FWE: FWE communication program is same as SBE.

5.2.2.5 WH/C-LOCAL communication: This communication is separate communication for each engine, each engine is in a similar way.

a. Put “WH/C-LOCAL" switch on operating console to " WH/C" position, "WH/C" lamp on monitoring box flashes, and accompanied with sound, after engine room receiving the signal, if WH/C is allowed, put the switch to "WH/C" position," WH/C" lamp on operating console flashes, meanwhile the sound disappears, WH/C connection ends.

b. When directly transfer from WH/C to LOCAL, switch in wheel house is to be directly transferred to" LOCAL" position from "WH/C" position," WH/C" lamp in engine room goes out, "Local" lamp flashes and accompanied with sound, after engine room receiving the signal, put the switch to "Local" position," Local" lamp in wheel house flashes, and sound disappears, local connection ends.

c. When engine room receive the "Local" command ,may do reversing and manual speed adjustment operation by using ahead and astern switch in engine room.

5.2.2.6 Emergency stop: press "Emergency stop "push button, main engine will immediately shutdown and accompanied with audible and visual alarm, after muffling, lamplight is to be kept till the emergency stop push button resets.

5.3 Debugging of system

System debugging mainly includes adjustment of reversing program, adjustment of speed governing device and alarm test.

5.3.1 Adjustment of reversing program

Reversing program may be adjusted one by one, in the first place switch on

the power supply ,manoeuvre the handle in wheel house ,pull to ahead from astern(or push to astern from ahead),synchronously observe the positioning signal, the time from astern lamp goes out to ahead lamp flashes should be about 5seconds,this time has been set before leaving from factory ,the adjustment is to be done by manufactory according to demand of real ship if required.

5.3.2 djustment of speed governing device

Push the maneuvering handle to the maximal position of ahead, here adjust the connection lever mechanism between actuating motor and throttle Setting lever ,make the gun of main engine speed governor is pulled to the maximal position; Pull the maneuvering handle to“0 "position, connecting gear of gun may keep the minimal rotational speed,adjust connecting gear time after time, and fix the connection screw or dowel after finishing the adjustment.

5.3.3 larm test

5.3.3.1 Power failure: shut off main power supply manually, standby power supply will plough into automatically, meanwhile, there should be audible and visual alarm for power failure, and the sound will disappear after pressing mute push button, power failure indicating lamp still has lamplight display, power failure indicating lamp will go out after main power supply restores, then the standby power supply exits automatically.

5.3.3.2 Error direction: manually make the maneuvering handle command disaccord with the action of reversing actuating mechanism, bring about "error direction" after 15S'delay . Here pressing the mute push button, then the sound disappears, error direction indicating lamp still has lamplight display, when the maneuvering handle command is synchronous with reversing actuating mechanism, error direction will go out automatically.

5.3.3.3 Main engine failure: manually input failure signal,there should be audible and visual alarm. Failure lamp still flashes after muffling, till the analog signal exits.

5.3.3.4 Gear box failure: manually input failure signal,there should be audible and visual alarm. Failure lamp still flashes after muffling, till the analog signal exits.

5.3.3.5 Overspeed: manually input failure signal,there should be audible and visual alarm for “overspeed". Failure lamp still flashes after muffling, till the analog signal exits.

6. Use and maintenance

6.1 Preparation and Check before use

6.1.1 System must be adjusted before use
6.1.2 Check whether the turning of mechanical joint is flexible
6.2 Operating sequence , method and matters need attention
6.2.1 All switches on operating console and engine room monitoring box should be put to initial position.
6.2.2 Switch on the general supply of operating console, do lamp test after indicating lamp of general supply flashes, and check whether the indicating lamp is in good condition ,Check whether all indicating lamps on engine room monitoring box are in good condition in a similar way.
6.2.3 Method for stand by engine program is referred to 5.2.2.4a.
6.2.4 Transform method for WH/C-LOCAL is referred to 5.2.2.5.
6.2.5 When finishing navigation, after engine room receiving the "FWE" command, switch is to be put to“FWE" position acting as countersign, shutdown after finishing the "FWE" operation, and "FWE" connection ends
6.2.6 Matters need attention
6.2.6.1 When manually control, clutch of follow-up gear is to be pulled out, or follow-up gear is to be declutched from throttle setting lever

7. Failure and maintenance

7.1Gear box can’t be reversed.
a. Check whether the transmitting panel of navigation bridge has output signal.
b. Check whether the main electric control panel has output signal.
c. Check amplificatory driving parts.
d. Whether the wiring has Looseness or broken wire .
7.2 Rotary speed of main engine can’t be adjusted
a.Check the transmitting panel of navigation bridge
b.Check the main electric control panel.
c.Check whether the joining part between slaving mechanism and main engine gun is flexible.
d.Check whether the gear box has feedback signal

8. Other

8.1 Partial components could be ordered separately
8.2 Indicate type of main engine, gear box and type, quantity of the required system .
8.3 If user has special requirement,we will specially design and manufacture.
8.4 Service hot line:Tel : (0372)3159512
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