

STCS 4000

Steering and Thruster Control System



Introduction

Navis Engineering OY, founded in 1992, is one of the leading suppliers of ship automation systems to the Russian and international marine industry. With more than 19 years of experience in development and hundreds of successful projects, we have established a full understanding of client needs and trends in world shipbuilding. Our goal is to deliver the industry's most reliable modern ship automation systems and meet the highest requirements for quality and ergonomics.

STCS 4000 (Steering and Thruster Control System) is a new multipurpose integrated steering and thruster control system based on digital technology. This system has superseded the company's previous control system, which became well-known among Russian designers and shipbuilders.

The main advantages of STCS 4000 are its network architecture, its flexibility and the interfaces that connect to different automation ship control systems; in addition, the system is equipped with a VDR (voyage-data-recorder) to provide data output.

The extensive experience gained by us on hundreds of steering gear system deliveries ensures high level of integration with modern steering gears of any make.

Alarm and Control Panel (ACP-I)

Panel ACP-I is designed to control the drive start/stop functions, indicate the status of drive and power supplies and to provide visual and audio alarms on supply failures, oil levels, drive overloads and other emergency situations.

The ACP-I offers an absolutely new approach to information display in "lower level" control systems and is the most compact and functional of its type in the industry.

Based on the priority display of alarms and information, the system contains more than 20 possible messages within the boundaries of the screen, thus making the panel multipurpose while keeping its dimensions to a minimum.

The start/stop system combines two principles of operation: electromechanical and logical. This is to improve reliability using additional electromechanical control contacts along with digital CAN bus.

The additional information display contains data about true and required rudder positions, thus avoiding the need for extra electromechanical indicators on the bridge. This, in turn, reduces panel dimensions and makes the system more accessible.

ACP-I features

1 Buttons for the hydraulic pump drive control have been made using "smoked foil" technology

2 LCD anti-glare screen with a viewing angle of 130°

3 Encoder

4 Alarm acknowledgement button and indicator

5 Control take/give/transfer button and indicator

6 Gasket IP65

7 Amplified connectors to the main cables with a large section connected directly to the panel

8 Two independent, isolated interfaces RS422

Technical specifications:

Overall dimensions (mm): 144 x 108 x 100

Supply voltage: 24VDC (18-36VDC)

Degree of protection (built-in): IP66

Power consumption: 12W ("TEST" mode)

Interfaces:

2 x CAN

4 x DQ

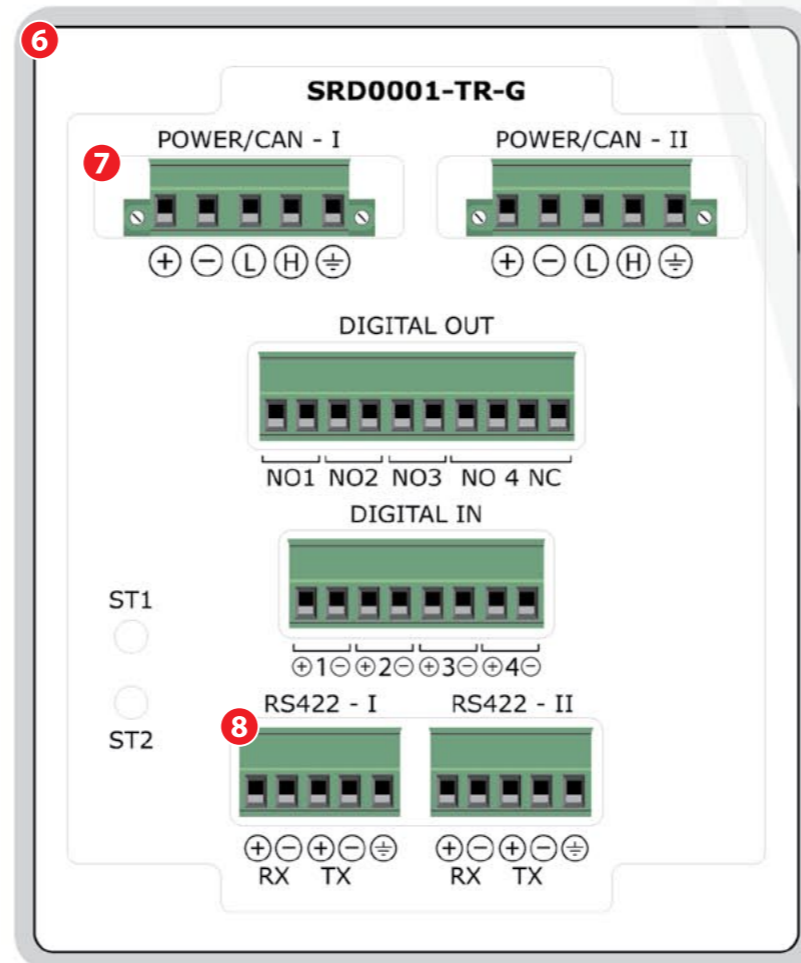
4 x DI

2 x RS422

Key specifications:

Operating temperature range: -25°C - +55°C

Storage temperature range: -40°C - +70°C



Main functions of ACP-I

Part of the screen is used for start/stop control, to check the status of the hydraulic pump drive and to display the control modes

The operator can change the status of the hydraulic pump drive by pressing the buttons beside the Start/Stop texts. The indication of the drive status is colour-coded: "red" – the drive is stopped, "green" – the drive is started, "grey" – the drive is not active.

The following control modes are available:

1. Normal mode (see figure).
2. "Not In Control"/NFU Override/ Local mode. In this mode the hydraulic pump drive control is not available; in this case the start/stop buttons are not lit, while the drive status indicator remains active.



Part of the screen displays main alarms

This part is designed to display information related to the main and control power of the hydraulic pump drive.

Main Power line shows the status of the main power; CTRL Power line – the status if the control power.

Part of the screen displays secondary alarms

Only three active alarms can be displayed simultaneously on the ACP-I panel screen. If there are more than three active alarms, the alarm system arranges them by priority. In addition, the first two lines are fixed and display information about high-priority alarms. The third line operates in accumulation mode arranged by priority.

Priority	Alarm	Alarm name	Alarm description
1	Phase fail (A)	Phase Fail	There no phase. Further operation of the system is not possible. The parameter specified in brackets determines a number of the phase.
2	Low Oil	Low Oil	Low oil level
3	Overload	Motor Overload	Motor is overloaded
4	FFU Fail	FFU Fail	FFU control failure
5	AUX Power	Aux Power Fail	Auxiliary power failure
6	HYDR.lock	Hydraulic Lock	Hydraulics is locked. Further operation of the system is not possible.
7	Oil Filter	Oil Filter	Oil filter is contaminated
8	Oil TEMP.	Oil Temperature	High oil temperature

Part of the screen displays the rudder and FFU lever position

- Blue-coloured indicators show the required position of the starboard and port rudders.
- Yellow-coloured indicators show the true position of starboard and port rudders.
- In case one of the high-priority modes ("Local" or "NFU Override") is activated, this control mode should be indicated instead of the required rudder positions.

Emergency Steering Control Panel (ESC-P)



The Emergency Steering Control Panel displays the hydraulic pump drive start/stop and provides an alarm signal. The ESC-P panel is specially designed for inexpensive applications and is optional for large vessels providing independent control even when failure of the main controller occurs.

Compact and with highly informative indicators, the unit's button configuration facilitates easy decision making for operators.

A continuous indication of the status of the hydraulic pump drive means that the panel even updates information in the passive mode.

Full-Follow-Up Lever (LVR-F)




The FFU lever is equipped with TAKE/GIVE buttons with an active station indicator and an ALARM ACK button. The unit also features a dimmer, operated via CAN-DIM bus to change the highlighting level of the devices supporting this protocol.

For Non-Follow-Up control, an identical NFU lever with the NFU OVERRIDE button can be used.

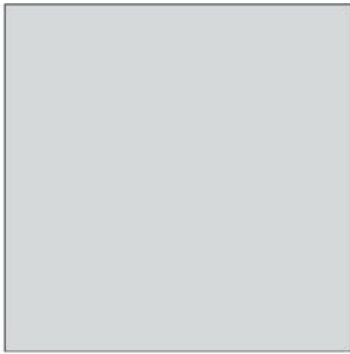
Rudder Position Indicator

STCS4000 uses a new type of combined indicator for the required/true rudder position display. The blue-coloured pointer indicates the true rudder position, while yellow-coloured pointer shows the required rudder position. The indicator incorporates a unique system of emergency transfer of pointers to an unseen dial area, in case acceptance limits are exceeded or indicator power failure occurs. This is to prevent the operator misinterpreting the information displayed.

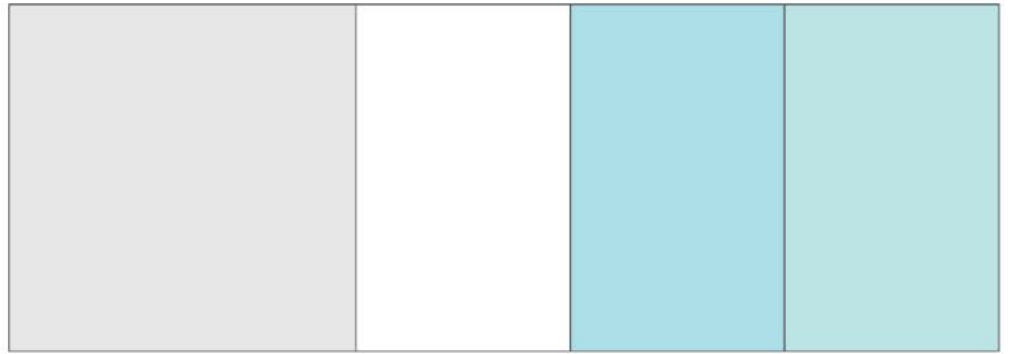
The scale includes a 'Lead To Current'  indicator that makes it possible to keep the operator informed about the need to match the required rudder position to the true one while switching to other control stations. Before matching the required and true rudder positions, the last set position should be saved.



Available colour versions for the control stations:

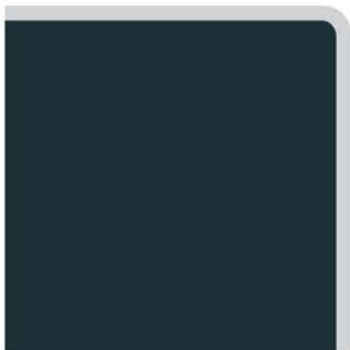


RAL 7035
(standard)

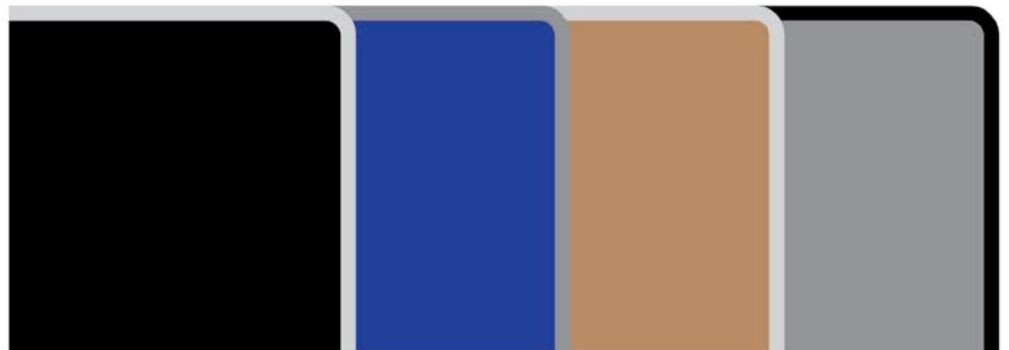


Other colour versions for the control stations:
(any RAL on request)

Available colour versions for the control panels:



RAL 7016
(standard)



Other colour versions for the control panels:
(any RAL on request)



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