



## Safety System SISY PANELWARE

### 1. General

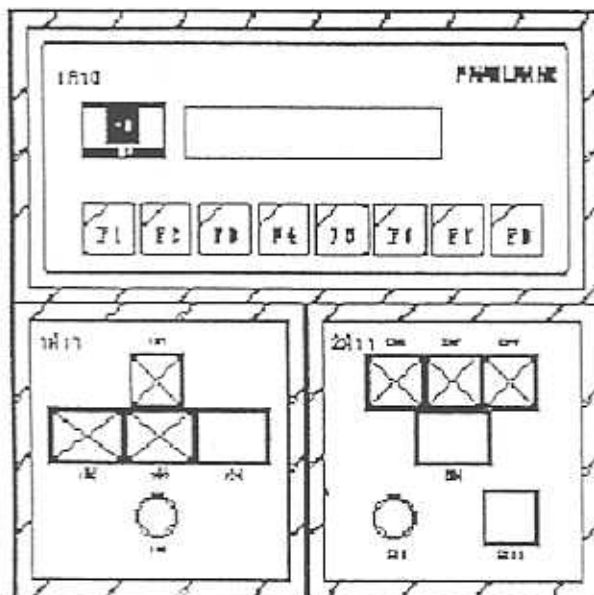
The safety system is a programmable logic control programmed as SAFETY SYSTEM.

It will be delivered with indication and operation panel. The PLC is installed on a mounting plate.

The nominal power supply is 24 V DC and it is operating between 20 V and 30 V DC.

#### 1.1 Safety System Panel

Size of panel 188 x 188 mm



Function Key F1: Main Engine Stop  
Function Key F2: Main Engine Reducing  
Function Key F3: Gear Box  
Function Key F4:  
Function Key F5: Broken Wire  
Function Key F6: Key Information  
Function Key F7:  
Function Key F8: Reset

1H9 Main Engine Stop  
1H10 Main Engine Reducing  
1S11 Reset Em. Stop / Reducing  
1S9 Lamp Test

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## 2. General

The safety system SISY Panelware is a monitoring system for the main engine and gear box, based on the programmable logic control system MODICON MICRO 612/03.

It includes all necessary safety functions which have to stop or reduce the ME. Broken wire can be monitored up to 12 binary transmitters.

Potential free changers are provided for following external outputs:

- Alarm System
- Start Interlock
- Pitch Propeller
- Shaft generator

### 2.1 Broken Wire Monitoring

The broken wire monitoring is splitted in four loops for following sensors:

Loop N° 1: sensor 1 overspeed  
sensor 2 emergency stop ECR  
sensor 3 emergency stop bridge

Loop N° 2: sensor 4 luboil temperature  
sensor 5 luboil pressure 1  
sensor 6 luboil pressure 2

Loop N° 3: sensor 7 cooling water temperature  
sensor 8 cooling water pressure  
sensor 9 exhaust gas temperature

Loop N° 4: sensor 10 oil mist concentration  
sensor 11 lub oil press. gear box  
sensor 12 bearing temp. crank shaft.

For broken wire monitoring, links have to be connected:

- stop valve (link 1X.10/IX.-)
- start valve (link 1X.11/IX.-)
- emg. shut down valve (link 1X.12/IX.-)

Broken wire monitoring is also working when main engine is not operating. A potential free changer from the safety system will signalize broken wire to the alarm system.

Broken wire indication on function key F5:

- flashing light - broken wire alarm not reset
- continuous light - alarm reset by reset button or function key F8

Broken wire indication on panel display:

- line N<sup>o</sup> 1: broken wire
- line N<sup>o</sup> 2: sensor no.xxx valve no.xxx

Information about broken wire:

Diode function key F5 continuous light  
Change display by pushing function key F5 until you get information on display.

Line one shows: broken wire  
Line two shows: loop N<sup>o</sup> - individual indication  
valve N<sup>o</sup> - individual indication

By pushing function key F6 you get the information which sensors are connected to broken wire monitoring loop.

There is a continuous alarm indication as long as the wire is broken and every new failure will activate the broken wire monitoring.

Up to three sensors can be connected in serial in one loop. For the identification of the sensor, resistors have to be connected in parallel to the sensor contact.

Dimensions of resistors:

Loop N<sup>o</sup> 1: sensor 1 - 2 k $\Omega$   
sensor 2 - 1 k $\Omega$   
sensor 3 - 510  $\Omega$

Loop N<sup>o</sup> 2: sensor 4 - 2 k $\Omega$   
sensor 5 - 1 k $\Omega$   
sensor 6 - 510  $\Omega$

Loop N<sup>o</sup> 3: sensor 7 - 2 k $\Omega$   
sensor 8 - 1 k $\Omega$   
sensor 9 - 510  $\Omega$

Loop N<sup>o</sup> 4: sensor 10 - 2 k $\Omega$   
sensor 11 - 1 k $\Omega$   
sensor 12 - 510  $\Omega$

### 3. Monitoring - General

The engine can be stopped either by using the normal stop button on the panel or by emergency stop from the safety system.

Only in case of emergency stop, the alarm system will be activated.

#### Automatic Stop Functions:

- Overspeed
- Emergency stop from ECR
- Emergency stop from bridge
- Lub oil pressure min.
- Lub oil pressure gear box min.

#### Automatic Engine Reducing Functions:

- Lub oil temperature high
- Cooling water pressure low
- Cooling water temperature high
- Oil mist in crank case
- Exhaust gas temperature high.

#### Functions of Relais:

- 1K1            emergency stop valve
- 1K2/1K02    stop valve
- 1K4            start valve
- 1K5            start interlock
- 1K6            common alarm
- 1K7/1K07    alarm emergency stop
- 1K8            reducing
- 1K10          ignition speed
- 1K11          emergency stop (manual)
- 1K12          emergency stop (manual released)

### 3.1 Automatic Stop Main Engine

#### 3.1.1 Overspeed Stop

In case of overspeed, the stop valve will be activated.

Signal from PLC will be sent to:

- pitch propeller system
- shaft generator breaker
- engine alarm system

Indication on safety system panel:

- Indication light ME stop: flashing - stop not reset
- Indication light ME stop: continuous light - stop reset

Indication on safety system panel:

- Diode F1 ME stop: flashing - stop not reset
- Diode F1 ME stop: continuous light - stop reset

Read out on display:

- Line one - ME stop
- Line two - Overspeed

#### **Reset Emergency Stop**

Reset of emergency stop is only possible after complete shut down of engine and adjustable time delay, by pushing "Reset" push button.

After reset, the indication light on the panel is "OFF". Also diode F1 is "OFF" and on display line one and two will be individual read outs.

If PLC fails, the overspeed stop will be done by an independent relay.

Functions and indications on panel as mentioned before (3.1.1), except the read out on display.

Read out will be:

- Line one - ME stop
- Line two - manual stop

Reset: as mentioned before (3.1.1).

#### 3.1.2 Automatic Emergency Stop

By pushing the emergency stop button in ECR or on bridge, the shut down valve will be activated.

Functions and indications on panel as mentioned before (3.1.1) except the read out on display.

Read out will be:

Line one - ME stop

Line two - stop from ECR or from bridge

Reset: as mentioned before (3.1.1).

#### Manual Emergency Stop

If PLC fails, the stop from ECR or bridge will be done by an independent relay.

Functions and indications on panel as mentioned before (3.1.1) except the read out on display.

Read out will be:

Line one - ME stop

Line two - manual stop

Reset: as mentioned before (3.1.1).

#### 3.1.3 Lub Oil Pressure Automatic Emergency Stop

In case of low lub oil pressure the stop valve will be activated.

Functions and indications on panel as mentioned before (3.1.1) except the read out on display.

Read out will be:

Line one - ME stop

Line two - low lub oil pressure

Reset: as mentioned before (3.1.1).

#### Lub Oil Pressure Manual Emergency Stop

If PLC fails, the lub oil pressure stop will be activated.

Functions and indications on panel as mentioned before (3.1.1) except the read out on display.



Read out will be:

- Line one - ME stop
- Line two - manual stop

Reset: as mentioned before (3.1.1).

#### 3.1.4 Lub Oil Pressure Gear Box Automatic Stop

In case of low lub oil pressure gear box, the stop valve will be activated. Signals from PLC and indication on panel as mentioned before (3.1.1).

Indication on safety system panel:

Keyboard: Diode F3: flashing - stop not reset  
Diode F3: continuous light - stop reset

Display: Line one: ME stop  
Line two: gear box low lub oil pressure

Reset: as mentioned before (3.1.1).

### 3.2 Inhibition

When the engine is not in operation, the lub oil- and cooling water pressure stops are inhibited. The inhibition will be released after engine starts and reaches ignition speed by a separate relay.

### 3.3 Start Interlock

Start interlock can be done by an external potential free contact or internal by programming the existing stops from the PLC.

Output start interlock by potential free changing contact.

Read out on display:

- Line one: start blocked
- Line two: sensor start interlock

## 6.1 Central Unit

### **CENTRAL UNIT CPU:**

The central processing unit (CPU) is the central controlling and calculating unit with one integrated coupling interface.

Interface PORT 1 is for communication with the panel.

### **BINARY DATA CAPTURE**

Alarm inputs as normal closed (NC), normal open (NO) contacts with 24 V DC level.

Alarm outputs 24 V DC level.

LED green: "Power Supply"

ON: power supply ok

OFF: power supply failure

LED yellow: "Ready"

ON: processor working

OFF: processor failure

LED green: "RUN"

ON: program working

OFF: program failure

LED red: "BAT LOW"

ON: system ok (battery not necessary)

LED green: "Port I"

ON: interface port 1 active

OFF: interface port 1 not active

LED green: "EXP LINK"

ON: interface port exp. link active

OFF: interface port exp. link not active

## 6.2 Monitoring Safety System

Following diodes have to be on:

- POWER OK
- READY
- BAT LOW

In case of missing indication, switch system "OFF" and "ON" again.

A system failure will be indicated on the duty alarm system.

