

TYPE APPROVAL CERTIFICATE

This is to certify:**That the NOx Selective Catalytic Reduction Control System**

with type designation(s)

SCRC-01, SCRC-02, SCRC-03, SCRC-04, SSBX-01, SSBX-02, SSBX-03, SSBX-04

Issued to

**Hanshin Electric Mfg. Co. Ltd.
Osaka, Japan**

is found to comply with

DNV GL rules for classification – High speed and light craft**DNV GL rules for classification – Ships****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Location classes:**

Temperature	A
Humidity	B
Vibration	A
EMC	A
Enclosure	B

Issued at **Høvik** on **2018-03-08**This Certificate is valid until **2020-03-07**.DNV GL local station: **Kobe**for **DNV GL**Approval Engineer: **Thorbjørn Hansen**

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Odd Magne Nesvåg
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



Product description

This type approval certificate covers the SCR control and monitoring system, produced by Hanshin Electric Mfg. Co. Ltd. for Yanmar Diesel Engines.

The SCR control and monitoring system comprises an SCR Control Panel and an SCR safety box.

The SCR Control Panel can be operated in different modes and may be configured to cover the following functions for a maximum of 4 engines:

- Urea water injection
- Operation of exhaust gas damper and catalyst bypass line
- Soot blow
- Intake air bleed
- Variable temperature rising (NY16 and N165 engine)
- NOx calibration (if NOx sensor is used)
- Urea water monitoring (up to two tanks)
- NH3 sensor (NH3 concentration inside the exhaust pipe: optional)
- NH3 alarm (NH3 leakage from the exhaust pipe: optional)

The SCR safety box covers the following functions for maximum 4 engines:

- Exhaust gas damper safety
- Exhaust gas catalyst bypass damper safety
- Catalyst differential pressure monitoring

Table 1: SCR Control / Safety system cabinets and software

Cabinet	Description	PLC SW	HMI SW
SCRC-01	SCR Control panel for one engine	109810-2301XXX	109810-2315XXX
SCRC-02	SCR Control panel for two engines		
SCRC-03	SCR Control panel for three engines		
SCRC-04	SCR Control panel for four engines		
SSBX-01	SCR Safety system for one engines	109810-2309XXX	109810-2143XXX
SSBX-02	SCR Safety system for two engines		
SSBX-03	SCR Safety system for three engines		
SSBX-04	SCR Safety system for four engines		

Application/Limitation

The formal supplier of the SCR control and monitoring system shall inform DNV GL in writing whenever the system is scheduled for installation on a DNV GL classed vessel. The letter to DNV GL shall include a signed copy of Annex 1 in this Type Approval Certificate together with the following project specific drawings ("A" and "I" indicates "Approval" and "Information" respectively):

- (A) Instrument and Alarm / Shut Down List (reference document no. G2-09810-0120) **Note A**
- (A) Test program for certification (reference document no. 1703-024-TM) **Note A**
- (I) P&ID (reference document no. P2-09810-0090) **Note A**
- (I) Outline of SCR system (reference document no. J2-09810-0530) **Note A, Note B**

Note A

Any principal change compared to the reference document shall be clearly identified (by cloud/bold/colour) in the project specific drawings and may be subject to case by case approval and certification.

Note B

The SCR System Configuration does not need to be project specific. The actual arrangement is reflected by combining this drawing with project specific information in Annex 1.



Job Id: **262.1-022566-1**
Certificate No: **TAA0000138**

Product certification according to Pt.4 Ch.9 Sec.1 [1.4] is required for installations with exhaust gas dampers.

As long as the system is covered by the Type Approval AND is without exhaust gas dampers, a product certificate according to Pt.4 Ch.9 Sec.1 [1.4] will not be required. Correct configuration and set up for each delivery to be tested during commissioning after installation, hereunder verification of alarms in the project specific parameter list as well as system alarms relayed to the vessels main alarm system.

The sensors used in the SCR system are not covered by this type approval certificate. Datasheet or similar proving compliance with the applicable environmental requirements (IACS UR E10 / Pt.4 Ch.9 Sec.5) shall be available and may be requested during installation and commissioning.

Type Approval documentation

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, November 2016.

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Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE

Annex 1 / Declaration

A signed copy of this declaration shall be filled in and submitted to class together with the following project specific drawings as specified under "Application/Limitation" in each delivery project. Changes in project specific drawings compared to the originally Type Approved revisions shall be clearly identified (by cloud/bold/colour):

- (A) Instrument and Alarm / Shut Down List (reference document no. G2-09810-0120)
- (A) Test program for certification (reference document no. 1703-024-TM)
- (I) P&ID (reference document no. P2-09810-0090)
- (I) Outline of SCR system (reference document no. J2-09810-0530)

1	Production place	
1.1	The subject system is produced and configured by Hanshin Electric / Osaka (YES / NO)	_____
2	Machinery	
2.1	The subject system serves Propulsion / Auxiliary (P/A)	_____
2.2	The no of engines served are	_____
3	System SW	
3.1	The supplied PLC SW for the SCR Control Panel is 109810-2301XXX (YES / NO).....	_____
3.2	The supplied HMI SW for the SCR Control Panel is 109810-2315XXX (YES / NO)	_____
3.3	The supplied PLC SW for the SCR Safety system is 109810-2309XXX (YES / NO)	_____
3.4	The supplied HMI SW for the SCR Safety system is 109810-2143XXX (YES / NO)	_____
4	Internal tests	
4.1	Internal testing as per document X2-09810-0030 is performed (YES / NO).....	_____

No	Selectable Device	Option No	Selectable Items	SCR No				Note
				1	2	3	4	
1	Exhaust gas Valve	1	None (No bypass line)					
		2	Two (Catalyst Inlet and Bypass)					
		3	Three (Catalyst inlet, Outlet and Bypass)					
2	Urea Tank	1	Single tank					
		2	Double Tank					
3	Pump	1	Single Pump					
		2	Double Pump					
4	NOx Sensor	1	None					
		2	Front					
		3	Rear					
		4	Front / Rear					
5	NH3 Sensor	1	None					
		2	Use					
6	NH3 Detector	1	None					
		2	Use					
7	Temperature Rising Valve	1	None					
		2	Butterfly Valve (Variable)					
		3	Solenoid Valve (Fixed)					

for Hanshin Electric

Sign. / date