

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Programmable Electronic System**

with type designation(s)

AC500-eCo

Issued to

**ABB Automation Products GmbH
Heidelberg, Germany**

is found to comply with

Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards**Application :****Location classes:**

Temperature	A*
Humidity	B
Vibration	A
EMC	A* or B*
Enclosure	Required protection according to DNV Rules shall be provided upon installation on board.

*** See pages 3 and 4 for more details.**This Certificate is valid until **2018-06-30**.Issued at **Høvik** on **2015-05-11**for **DNV GL**DNV GL local station: **Augsburg**Approval Engineer: **Nils Jarem****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.

Certificate No: **A-14297**
 File No: **862.50**
 Job Id: **262.1-007956-6**

Product description

ABB AC500-eCo Scalable Programmable Logic Controller with S500 I/O-Modules.

Type	Description
CPUs	
PM554-T	PM554-T:AC500, SPS, 128kB, 8DI/6DO-T, 24VDC
PM554-T-ETH	PM554-T-ETH:AC500, SPS, 128kB, 8DI/6DO-T, ETH
PM554-TP	PM554-TP:AC500, SPS, 128kB, 8DI/6DO-T, 24VDC
PM554-TP-ETH	PM554-TP-ETH:AC500, SPS, 128kB, 8DI/6DO-T, ETH
PM554-R	PM554-R:AC500, SPS, 128kB, 8DI/6DO-R, 24VDC
PM554-R-AC	PM554-R-AC:AC500, SPS, 128kB, 8DI/6DOR, VAC
PM554-RP	PM554-RP:AC500, SPS, 128kB, 8DI/6DO-R, 24VDC
PM554-RP-AC	PM554-RP-AC:AC500, SPS, 128kB, 8DI/6DOR, VAC
PM556-TP-ETH	PM556-TP-ETH:AC500, SPS, 512kB, 8DI/6DO-T, ETH
PM564-T	PM564-T:AC500, SPS, 128kB, 6DI/6DO-T/2AI/1AO
PM564-T-ETH	PM564-T-ETH:AC500, SPS, 128kB, 6DI/6DO-T/2AI/1AO
PM564-TP	PM564-TP:AC500, SPS, 128kB, 6DI/6DO-T/2AI/1AO
PM564-TP-ETH	PM564-TP-ETH:AC500, SPS, 128kB, 6DI/6DO-T/2AI/1AO
PM564-R	PM564-R:AC500, SPS, 128kB, 6DI/6DO-R/2AI/1AO
PM564-R-ETH	PM564-R-ETH:AC500, SPS, 128kB, 6DI/6DOR/2AI
PM564-R-ETH-AC	PM564-R-ETH-AC:AC500, SPS, 128kB, 6DI/6DO-R
PM564-R-AC	PM564-R-AC:AC500, SPS, 128kB, 6DI/6DO-R/2AI/1AO
PM564-RP	PM564-RP:AC500, SPS, 128kB, 6DI/6DO-R/2AI/1AO
PM564-RP-ETH	PM564-RP-ETH:AC500, SPS, 128kB, 6DI/6DO-R
PM564-RP-ETH-AC	PM564-RP-ETH-AC:AC500, SPS, 128kB, 6DI/6DO-R
PM564-RP-AC	PM564-RP-AC:AC500, SPS, 128kB, 6DI/6DO-R/2AI/1AO
I/O-Modules	
DX561	8 isolated DO (24V DC, T), 8DI (24V DC)
DC561	16 isolated DI/DO (24V DC)
DI561	8DI (24V DC)
DO561	8DO (24V DC, T)
AX561	4AI, 2AO (24V DC)
AI561	4AI
AO561	2AO
DI562	2x8 isolated DI (24V DC)
AI562	2AI, RTD (resistance temp. detector), 24V DC
AI563	4 isolated AI, TC (thermocouples), 24V DC
DX571	8DO (120/240V AC, R, 2A), 8DI (24V DC)
DO571	8DO (120/240V AC, R, 2A)
DI571	8DI (120/240V AC)
DO572	8DO
Accessories	
TK503, TK504	Programming cable
TK506	RS-485 isolator for COM1
MC503	SD Memory Card expansion module
TA561-RTC	Real-time clock expansion module
TA562-RS	Serial communication interface COM2
TA562-RS-RTC	Serial communication interface COM2 with real-time clock
TA560-BAT	Lithium battery for real-time clock
TA566	Wall mounting for eCo modules
L44440901501	Terminal
L44441101501	Terminal
L44460901501	Terminal
L44461101501	Terminal

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Type	Description
L44470901501	Terminal
L44471101501	Terminal
TA563-9, TA563-11,	Terminals
TA564-9, TA564-11	Terminals
TA565-9, TA565-11	Terminals

Compass Type	Distance
Steering	20 cm
Standard	10 cm

Place of manufacture

WELCO TECHNOLOGY GUANGDONG:

WELCO TECHNOLOGY (SHENZHEN) LTD.
WANFENG INDUSTRIAL ESTATE,
34 THE EAST OF WANZHANG PU,
SHAJING, BAOAN, SHENZHEN,
GUANGDONG,
P.R.CHINA

Approval conditions

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV Rules for Ships Pt.4 Ch.9 Control and Monitoring Systems.

Product certificate

If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. After the certification the clause for application software control will be put into force.

Clause for application software control

All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV for evaluation and approval. Major changes in the software are to be approved before being installed in the computer

Application/Limitation

The EMC location class is normally B, but with the following limitations or conditions:

To satisfy EMC class A requirements a metal cabinet with maximum slot length between metallic contacts of 45 cm is required for the following models:

- PM554-T, PM554-T-ETH, PM554-R, PM554-R-AC
- PM564-T, PM564-T-ETH, PM564-R, PM564-R-ETH, PM564-R-ETH-AC, PM564-R-AC.

PM554-T-ETH, PM554-R, DX571, MC503 and TA562 comply with EMC class B when one of the below conditions is satisfied:

option a)

Small cabinet with power supply filter SCHAFFNER FN2010-3-07 (3A) or equivalent
Additional X capacitor : 220 nF on ECO side (EUT) or 100 nF on EUT side

option b)

Small cabinet with power supply filter SCHAFFNER FN2010-1-07 (1A) or equivalent

The following modules has been tested at -25°C:

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- PM554-R-AC, PM564-R-AC, PM564-T/R, PM554-T
- DX561, DI561, DO561, DC561, DI571, DX571, DO571, DI571, DO572
- AX561, AI562, AI561, AO561, AI563
- TA562-RS-RTC, MC503, TA561-RTC, TA562-RS

The CPU module types PM5xx-xP... and the IO module types are used with any of the terminals types L44440901501, L44441101501, L44460901501, L44461101501, L44470901501, L44471101501, TA563-9, TA563-11, TA564-9, TA564-11, TA565-9, or TA565-11

Type Approval documentation

Test Reports:

- EMV Rhein Neckar GmbH 3893-394f dated 04.09.2009
- ABB High Voltage Test protocol D2009032 dated 28.07.2009
- paconsult 09-2475B dated 06.07.2009
- Ship Approval Test Specification dated 12.05.2009, ver. 1.4
- SITIIAS EMC Test Report no.: C10-133-WT for PLC AC500-eCo (PM564-T-ETH and PM564-R-ETH-AC) dated 2010-06-01
- XIAMEN EMC Test Report no.: 2010H_W032 fr PM564-T-ETH & PM564-R-ETH-AC
- EMV Rhein Neckar GmbH, "110811 AC500eco Emission Ship.doc", project number: 3893, dated 2011-08-11
- paconsult Test Report No. 12-4737 Rev. 1, dated 2012-12-14
- CESI EMC Test Report SEC12-0456WM-E-E1dated 2012-11-28
- CESI EMC Test Report SEC12-0456WM-E-E2dated 2012-11-28

System description/Installation instructions: 2CDC125080M0201.zip

ABB Automation products 2009 AC500, AC31, CP400, WISA

Overview_ShipApproval_AC500eCo_AC500

Test Specification for Ship-Approval Tests, dated 2012-11-16

Product data sheets:

- AI561, AI562, AI563, AO561, AX561, DC561, DI571, DI561, DI562, DO561, DO571, DO572, DX561, DX571, PM554, MC503, TA562 and PM564 with ETH dated 2010-07-09.
- TK506 dated 2012-10-10, CPUs Types PM554 and PM564 dated 2012-10-19,
- TA563-TA565 Terminal Blocks dated 2012-11-19,
- TA566 Wall Mounting Accessory dated 2012-11-19
- TK504 Programming Cable dated 2013-11-19

Initial Survey Report dated 24.03.2009, DNV Essen

DNV GL Guangzhou Type approval assement report for A-13521, dated 2015-04-27

Tests carried out

Applicable tests according to Standard for Certification No. 2.4, April 2006.

Radiated Emission test for PM564-T-ETH and PM564-R-ETH-AC carried out according to IEC 60945:2002 standard.

For the bridge mounted components the 'Compass safe distance' was measured according to section 11.2 of IEC 60945 4th edition (002).

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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

Periodical assessment is to be performed at least every second year and at renewal of this certificate.

END OF CERTIFICATE