DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **A-13767**

This is to certify that the
Programmable Electronic System

with type designation(s)
AC500 / S500 AC 700F / S 700F AC500 XC / S500 XC / AC500-S / AC500-S-XC

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***
Enclosure	**Required protection according to DNV Rules shall be provided upon installation on board**

*** See Application/Limitation for more details**

This Certificate is valid until **2016-06-30**.

Issued at **Høvik** on **2014-05-27**

DNV local station: **Augsburg**

Approval Engineer: **Nils Jarem**

for **Det Norske Veritas AS**

Digitally Signed By: Sneen, Ståle
Location: DNV Høvik, Norway
Signing Date: 2014-05-28, on behalf of

Odd Magne Nesvåg
Head of Section

Product description

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

Actual naming of AC500 / S500	Additional naming for AC500F / S500 F	Description
CPUs (*)		
PM571, PM571-ETH, PM571-ARC	-	AC500 CPU 64kB, Option for Ethernet or ARCNET
PM572	-	AC500 CPU 128kB, Ethernet
PM573-ETH	-	AC500 CPU 128kB, Ethernet
PM581, PM581-ETH, PM581-ARC, EC581-ARC	-	AC500 CPU 256kB, Option for Ethernet or ARCNET
PM582, PM582-ETH, PM582-ARC	-	AC500 CPU 512kB, Option for Ethernet or ARCNET
PM583-ETH	PM 783F-ETH	AC500 CPU 1MB, Ethernet
PM590, PM590-ETH, PM590-ARC	-	AC500 CPU 2048kB, Option for Ethernet or ARCNET
PM591, PM591-ETH, PM591-ARC	-	AC500 CPU 4MB, Option for Ethernet or ARCNET
PM592-ETH	-	AC500 CPU 4MB Ethernet
Terminal Bases (*)		
TB511, TB511-ETH, TB511-ARC	TB 711F	AC500 CPU Terminal Base, 1x Coupler Slot
TB521, TB521-ETH, TB521-ARC	-	AC500 CPU Terminal Base, 2x Coupler Slots
TB541, TB541-ETH, TB541-ARC	-	AC500 CPU Terminal Base, 4x Coupler Slots
I/O-Modules (*)		
DI524	DI 724F	S500 32 DI 24V DC, 1-wire
DC522	DC 722F	S500 16 DC (Digital In/Outputs), 24V DC 0,5A
DC523	DC 723F	S500 24 DC (Digital In/Outputs), 24V DC 0,5A
DC532	DC 732F	S500 16 DI + 16 DC, 24V DC 0,5A
DX522	DX 722F	S500 8 DI 24V DC, 8 Relay Outputs, 2-wire
DX531	DX 731F	S500 8 DI 230V AC, 8 Relay Outputs, 2-wire
DC541	-	S500 8 DC 24V DC 0,5A, Connection via CPU Terminal Base
DC505-FBP	DC 705F-FBP	S500 8 DI / 8 DC, 24V DC 0,5A, with Fieldbus Interface
DC551-CS31	-	S500 8 DI / 16 DC, 24V DC 0,5A, with CS31 Interface
AX521	AX 721F	S500 4 AI / 4 AO, U/I/Pt100, 12-bit+sign, 2-wire
AX522	AX 722F	S500 8 AI / 8 AO, U/I/Pt100, 12-bit+sign, 2-wire
AI523	AI 723F	S500 16 AI, U/I/Pt100, 12-bit+sign, 2-wire
AO523	AO 723F	S500 16 AO, 12-bit+sign, 2-wire
DA501	DA 701F	S500 16DI / 8DC, 4AI / 2AO, 12-bit+sign
AC522	AC 722F	S500 8AI / 8AO, 12-bit+sign
PD501	-	S500 AI 24V DC Motor outputs
AI531	AI 731F	S500 8 AI, U, I, R, RTD and TC
CD522	CD 722F	S500 Encoder & PWM Module 2 DI, 8 (DI/DO) 24V DC
Decentralized I/O Modules (*)		
CI501-PNIO	-	S500 4AI / 2AO, 8DI / 8DO 24V DC, 0.5 A max
CI502-PNIO	-	S500 8DI / 8DO / 8 DC, 24V DC, 0.5 A max
CI504-PNIO	-	S500 CI504-PNIO-XC:S500, Bus-Mod. PROFINET/Serial
CI506-PNIO	-	S500 CI506-PNIO-XC:S500,Busmodul PROFINET/Ser/CAN
CI511- EtherCat	-	S500 4AI / 2AO, 8DI / 8DO 24V DC, 0,5 A max
CI512- EtherCat	-	S500 8DI / 8DO / 8DC, 24V DC, 0,5 A max
CI541-DP	-	S500 4AI / 2AO, 8DI / 8DO 24V DC, 0.5 A max
CI542-DP	-	S500 8DI / 8 DO 24V DC, 0.5 A max
CI581-CN	-	S500 4AI / 2AO, 8DI / 8DO 0.5 A max
CI582-CN	-	S500 8DI, 8DO / 8DC 24V DC, 0.5 A max
CI590	-	S500 16 DC 24V DC
CI592	-	S500 4 AI / 2AO, 8 DI, 8 DC

Terminal Units (*)		
TU505-FBP, TU506-FBP	TU 705F, TU 706F	AC500 FBP Terminal Unit
TU515, TU516	TU 715F, TU 716F	AC500 I/O Terminal Unit, 24V DC
TU531, TU532	TU 731F, TU 732F	AC500 I/O Terminal Unit, 230V AC
TU541, TU542	-	AC500 Terminal Units for PD501
TU551-CS31, TU552-CS31	-	AC500 Terminal Units for DC551
TU507, TU508	-	Terminal Units for PROFINET or EtherCAT® Bus Modules
TU509-DP / TU510-DP	-	Terminal Units for PROFINET Bus Modules
TU517 / TU518	-	Terminal Units for CANopen or DeviceNet Modules
TU520-ETH	-	PROFINET IO Terminal Unit for PROFINET IO Bus Modules
Communication Couplers (*)		
CM572-DP	CM572F	AC500 Communication Module Profibus DP Master
CM575-DN	-	AC500 Communication Module DeviceNet Master
CM577-ETH	-	AC500 Communication Module Ethernet TCP/IP
CM578-CN	-	AC500 Communication Module CanOpen Master
CM574 RCOM	-	AC500 Communication Module RS232, RS485(RCOM)
CM574 RS	-	AC500 Communication Module CS31,RS232,RS485 (Modbus, ASCII)
CM579 PNIO	-	AC500 Profinet RT (dual-port RAM)
CM579-Ethcat	-	AC500 Communication Module for PM57x, PM58x, PM59x
CM588-CN	-	AC500 Communication Module for CANopen
Accessories (*)		
MC502	-	AC500 Memory Card
TA521	-	AC500 Lithium Battery
TA524	TA 724F	AC500 Communication dummy module
TA526	-	AC500 Wall Mounting
Safety CPU(*)		
SM500-S		Safety CPU (Safety Module) for up to SIL 3 (IEC 61508 and IEC 62061) and PL e (ISO 13849) safety applications
Safety I/O modules (*)		
DI581-S		Safety binary input module DI581-S with 16 safety Input channels (up to SIL2 or PL d) or 8 safety input channels (up to SIL3 or PL e) with 8 test pulse output channels
DX581-S		Safety blnary input/output module DX581-S with 8 safety output channels and 8 safety input channels (up to SIL2 or PL d) or 4 safety input channels (up to SIL3 or PL e) with 4 test pulse output channels
AI581-S		Safety analog input module AI581-S with 4 Safety current input channels o…20 mA (up to SIL2 or PL d) or 2 safety current input channels (up to SIL3 or PL e)
Safety Terminal Unit (*)		
TU582-S		Spring terminal unit TU582-S for safety I/O modules
Software:		
(Only relevant for AC500-S Safety products!): Type PS501; Control Builder Plus V2.2.1 or later (it may be Included in Automation Builder software package)		

(*) may be followed by XC (eXtreme Conditions)

Manufactured by

ABB STOTZ-KONTAKT GmbH
78132 Hornberg
Hauptstr. 12-16
Germany

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
Each delivery of the application system is to be certified according to Pt.4 Ch.9 Sec.1. The certification test is to be performed at the manufacturer of the application system according to an approved test program before the system is shipped to the yard. 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

Modules DC505 and DC551 require a power supply filter Schaffner FN 610 3/06 or equivalent to satisfy EMC class A requirements for conducted emission.

The following modules have been tested according to DNV Standard for Certification No. 2.4 at -25°C:

- CI501/CI502, CI590, CI592, AI531, CD522, CM574 CM579,
- TU507/TU508
- PM592,covering PM590/PM591, PM583 covering PM573
- TB521 covering also TB511
- CI541, CI542, CI581, CI582, CI504, CI506
- DC532 covering DC523, DC522,
- CM588, CM579, CM578, CM574
- TU509, TU510, TU517, TU518, TU520, TU516

Type Approval documentation

Test reports:
paconsult 0790-05 dated 2005-12-08
paconsult 1094-05 dated 2006-10-16
paconsult 09-2475B dated 2009-07-06
paconsult 11-3684 dated 2011-08-19
EMV Rhein Neckar GmbH 3893-359 dated 2006-02-09
EMV Rhein Neckar GmbH 3893-365 dated 2006-06-26
EMV Rhein Neckar GmbH 3893-384 dated 2009-02-14
EMV Rhein Neckar GmbH 3893-385e dated 2009-04-25 (CM574)
EMV Rhein Neckar GmbH 3893-386e dated 2009-05-16 (CI590)
EMV Rhein Neckar GmbH 3893-388e dated 2009-06-01 (CI592)
EMV Rhein Neckar GmbH 3893-390e dated 2009-06-01
EMV Rhein Neckar GmbH 3893-392e dated 2009-06-27
EMV Rhein Neckar GmbH 3893-395a dated 2009-11-06
EMV Rhein Neckar GmbH 3893-399 dated 2010-07-21
EMV Rhein Neckar GmbH 3893-3105 dated 2011-09-26
ABB High Voltage Test protocol D2005051 dated 2005-12-19
ABB High Voltage Test protocol D2006054 dated 2006-08-02
ABB High Voltage Test protocol D2009032 dated 2009-07-28
ABB High Voltage Test protocol D2011042 dated 2011-10-24
ABB Vibration protocol V20110039 rev. 1.1
Clima_Tests_For _Ship_PM58x-ETH_PM57x-ETH_1.pdf
Clima_Tests_For _Ship_PM59x-ETH_0.pdf
Ship Approval Test Specification ver. 1.8 dated 2011-08-02
Test Report No.: 3893-3113a dated 2012-12-19
Test Report 12-4737 Rev.1

System description:	Introduction to AC500 dated 08.2005
Installation instructions:	DC541-CM, DC551-CS31, DX531, PD501-4CH, PM571, PM581 PM582, PM591, TB511, TB521, TB541, TU515, TU516, TU531, TU532, TU541, TU542, TU551-CS31, TU552-CS31
Product data sheets:	ABB AC500/S500 2008 Catalogue Chapter 8 (pages 8/5-8/19) ABB Automation products 2009 AC500, AC31, CP400, WISA ABB, Welcome to the AC500-S Safety PLC; 3ADR025011B0201
Data sheets for modules:	AI531, CD522, CI501, CI502, CI504-PNIO, CI506-PNIO, CI511, CI512, CI541-DP, CI542-DP, CI581-CN, CI582-CN, CM574-RCOM, CM574-RS, CM579-EtherCat, CM579-PNIO, CM588-CN, TU507_508, TU509-DP, TU510-DP, TU517-CNDN, TU518-CNDN, TU520-ETH, DA501, PM57x, PM58x, and PM59x, TA521, TA526

A-12590 Retention Survey Report dated 2012-04-26, DNV Essen.

Tests carried out

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

Marking of product

The products to be marked with model name, manufacturer name and serial number

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