



# TYPE APPROVAL CERTIFICATE

Certificate No:  
**TAA00000V0**  
Revision No:  
**8**

## This is to certify:

**That the Programmable Electronic System**

with type designation(s)  
**AC500 / S500, AC500-XC / S500-XC, AC500-S / AC500-S-XC**

Issued to

**ABB AG**  
**Heidelberg, Germany**

is found to comply with

**DNV rules for classification – Ships, offshore units, and high speed and light craft**

## Application :

**Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.**

### Location classes:

Temperature	B, D*
Humidity	B
Vibration	A
EMC	A*, B*
Enclosure	A

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

Issued at **Hamburg** on **2022-01-04**

This Certificate is valid until **2026-12-22**.

DNV local station: **Augsburg**

for **DNV**

Approval Engineer: **Dariusz Lesniewski**

.....  
**Joannis Papanuskas**  
**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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: TA 251

Revision: 2021-03

www.dnv.com

Page 1 of 5

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

Module	Description
<b>CPUs</b>	
PM5630-2ETH	8MB memory, 2xEthernet, 1xRS232/485, CAN
PM5650-2ETH	80MB memory, 2xEthernet, 1xRS232/485, CAN
PM5670-2ETH	160MB memory, 2xEthernet, 1xRS232/485, CAN
PM5675-2ETH	160MB memory, 8GB Flash disk, 2xEthernet, 1xRS232/485, CAN
PM572	128kB memory, 2xRS232/485, FBP
PM573-ETH	512kB memory, 2xRS232/485, FBP, 1xEthernet
PM582	512kB memory, 2xRS232/485, FBP
PM583-ETH	1MB memory, 2xRS232/485, FBP, 1xEthernet
PM585-ETH	1MB memory, 2xRS232/485, FBP, 1xEthernet
PM590-ETH	2MB memory, 2xRS232/485, FBP, 1xEthernet
PM590-ARCNET (up to Index A9)	2MB memory, 2xRS232/485, FBP, 1xARCNET
PM591-ETH	4MB memory, 2xRS232/485, FBP, 1xEthernet
PM591-2ETH	4MB memory, 2xRS232/485, FBP, 2xEthernet
PM592-ETH	4MB memory, 4GB Flash disk, 2xRS232/485, FBP, 1xEthernet
PM595-4ETH-F	1.3 GHz, 16MB memory, 2xEthernet, 4xEthernet based fieldbus
PM595-4ETH-M-XC	1.0 GHz, 16MB memory, 2xEthernet, 4xEthernet based fieldbus, 2xRJ45
<b>Terminal Bases</b>	
TB511-ETH, TB511-ARCNET	CPU Terminal Base, 1xCoupler Slot, 1xEthernet RJ45 (1xARCNET)
TB521-ETH, TB521-ARCNET	CPU Terminal Base, 2xCoupler Slots, 1xEthernet RJ45 (1xARCNET)
TB523-2ETH	CPU Terminal Base, 2xCoupler Slots, 2xEthernet RJ45
TB541-ETH	CPU Terminal Base, 4xCoupler Slots, 1xEthernet RJ45
TB5600-2ETH	CPU Terminal Base, 2xEthernet RJ45, 1xCAN
TB5610-2ETH	CPU Terminal Base, 1xCoupler Slot, 2xEthernet RJ45, 1xCAN
TB5620-2ETH	CPU Terminal Base, 2xCoupler Slots, 2xEthernet RJ45, 1xCAN
TB5640-2ETH	CPU Terminal Base, 4xCoupler Slots, 2xEthernet RJ45, 1xCAN
TB5660-2ETH	CPU Terminal Base, 6xCoupler Slots, 2xEthernet RJ45, 1xCAN
<b>I/O-Modules</b>	
DI524	32 DI 24V DC, 1-wire
DC522	16 DC (Digital In/Outputs), 24V DC 0,5A, 1-wire
DC523	24 DC (Digital In/Outputs), 24V DC 0,5A, 2-wires
DC532	16 DI/16 DC, 24V DC 0,5A, 1-wire
DX522	8 DI 24V DC, 8 Relay Outputs, 1-wire
DX531	8 DI 230V AC, 8 Relay Outputs, 2-wires
DC541-CM	8 DC 24V DC 0,5A, Connection via CPU Terminal Base
DC551-CS31	8 DI/16 DC, 24V DC 0,5A, with CS31 Interface
AX521	4 AI/4 AO, U/I/RTD, 12-bit+sign, 2-wires
AX522	8 AI/8 AO, U/I/RTD, 12-bit+sign, 2-wires
AI523	16 AI, U/I/RTD, 12-bit+sign, 2-wires
AO523	16 AO, 12-bit+sign, 2-wires
DA501	16 DI/8 DC, 4AI / 2 AO, 12-bit+sign
AC522	8AI / 8AO, 12-bit+sign
PD501-4CH	AI 24V DC Motor outputs
AI531	8 AI/U/I/R/RTD/TC
CD522	Encoder & PWM Module 2 DI, 8 (DI/DO) 24V DC
DO524	32 DO, 24 VDC / 0.5 A, 1-wire
DO526	8 DO, 24 VDC / 2 A, 1-wire

Module	Description
<b>Communication Interface Modules</b>	
CI501-PNIO	PROFINET IO, 4AI / 2AO, 8DI / 8DO 24V DC, 0.5 A max
CI502-PNIO	PROFINET IO, 8DI / 8DO / 8 DC, 24V DC, 0.5 A max
CI504-PNIO	PROFINET IO, 3xRS232/422/485
CI506-PNIO	PROFINET IO, 2xRS232/422/485, 1xCAN
CI511-ETHCAT	EtherCat, 4AI / 2AO, 8DI / 8DO 24V DC, 0.5 A max
CI512-ETHCAT	EtherCat, 8DI / 8DO / 8DC, 24V DC, 0.5 A max
CI521-MODTCP	Ethernet Modbus TCP, 4AI / 2AO / 8DI / 8DO, 24V DC, 0.5 A
CI522-MODTCP	Ethernet Modbus TCP, 8DI / 8DO / 8DC, 24V DC, 0.5 A
CI541-DP	Profibus-DP, 4AI / 2AO, 8DI / 8DO 24V DC, 0.5 A max
CI542-DP	Profibus-DP, 8DI / 8 DO 24V DC, 0.5 A max
CI581-CN	CANopen, 4AI / 2AO, 8DI / 8DO 0.5 A max
CI582-CN	CANopen 8DI, 8DO / 8DC 24V DC, 0.5A max
CI590-CS31-HA	CS31-HA (2x), 16 DC, 24V DC, 0.5 A
CI592-CS31	CS31, 4 AI / 2AO, 8 DI, 8 DC, 24V DC, 0.5 A
<b>Terminal Units</b>	
TU505-FBP, TU506-FBP	FBP Terminal Unit
TU515, TU516	I/O Terminal Unit, 24V DC
TU531, TU532	I/O Terminal Unit, 230V AC
TU541, TU542	I/O Terminal Unit, 24V DC
TU551-CS31, TU552-CS31	Terminal Units for DC551
TU507-ETH, TU508-ETH	Terminal Units for PROFINET IO and EtherCAT Modules
TU509 / TU510	Terminal Units for PROFIBus and CANopen Modules
TU517 / TU518	Terminal Units for CANopen and DeviceNet Modules
TU520-ETH	Terminal Unit for PROFINET IO Modules
<b>Communication couplers</b>	
CM574-RS	Communication Module CS31,RS232,RS485 (Modbus, ASCII)
CM579-PNIO	Communication Module PROFINET, Integrated 2-port switch
CM579-ETHCAT	Communication Module for PM57x, PM58x, PM59x
CM588-CN	Communication Module CANopen
CM589-PNIO	Communication Module PROFINET, Integrated 2-port switch
CM589-PNIO-4	Communication Module PROFINET, Integrated 2-port switch, 4xIO devices
CM592-DP	Communication Module ProfiBus DP Master
CM597-ETH	Communication Module Ethernet TCP/IP, UDP/IP, Modbus TCP
CM598-CN	Communication Module CANopen
<b>Function Modules</b>	
FM502-CMS	Function Module for Condition Monitoring
<b>Terminal Bases for Function Modules</b>	
TF521-CMS	CMS Terminal Base AC500, slots: 1xFM502, 1xCPU, 2xcommunication modules, 1xEthernet RJ45
TF501-CMS	CMS Terminal Base AC500, slots: 1xFM502, 1xCPU, 1xcommunication module, 1xEthernet RJ45 connector
<b>Accessories</b>	
MC502	Memory Card
TA521	Lithium Battery
TA524	Communication dummy module
TA526	Wall Mounting
<b>Safety CPU</b>	

Module	Description
SM560-S	Safety CPU for up to SIL 3 (IEC 61508 and IEC 62061) and PL e (ISO 13849) safety applications
SM560-S-FD-1	Safety CPU for up to SIL 3 (IEC 61508 and IEC 62061) and PL e (ISO 13849) safety applications with F-Device functionality for 1xPROFIsafe network
SM560-S-FD-4	Safety CPU for up to SIL 3 (IEC 61508 and IEC 62061) and PL e (ISO 13849) safety applications with F-Device functionality for 4xPROFIsafe networks
<b>Safety I/O modules</b>	
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 binary 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 0...20 mA (up to SIL2 or PL d) or 2 safety current input channels (up to SIL3 or PL e)
<b>Safety Terminal Unit</b>	
TU582-S	Spring terminal unit TU582-S for safety I/O modules

Module name may be followed by **-XC** (eXtreme Conditions)

#### Compass Safe Distance (AC500 / S500 / AC500-XC / S500-XC)

Type	Distance
Steering	130 cm
Standard	150 cm

## 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 mains filter of type Schaffner FN 610 3/06 or equivalent.
- Mounting in a separate metallic cabinet required for:  
FM502-CMS, FM502-CMS-XC, TF501-CMS, TF521-CMS, TF501-CMS-XC, TF521-CMS-XC, SM560-S-FD-1, CI521-MODTCP, CI522-MODTCP, CM589-PNIO.
- EMC location class B for modules only:  
CPU PM591-2ETH, CPU PM585-ETH, TB523-2ETH, TB541-ETH, CM574-RS, CM598-NC, AX521, DA501, TU51617 / mains filter of type SCHAFFNER FN2010-10-06 or equivalent is required.
- EMC location class B for modules only:  
CM579-ETH, CM589-PNIO, DO524  
PM595-4ETH-F, PM595-4ETH-M-XC  
PM5630-2ETH, PM5650-2ETH, PM5670-2ETH, PM5675-2ETH,  
TB5600-2ETH, TB5610-2ETH, TB5620-2ETH, TB5640-2ETH, TB5660-2ETH  
Mains filter of type SCHAFFNER FN2010-10-06 or equivalent is required.  
Mounting in a separate metallic cabinet is required.
- Temperature location class D: applies for -XC (eXtreme Conditions) variants.
- Installation in enclosure of flame-retardant material (all modules)

## Type Approval documentation

### Tests carried out

Applicable tests according to Class Guidance DNV-CG-0339, August 2021.

For on bridge mounted components the 'Compass safe distance' was measured according to section 11.2 of the IEC 60945 4<sup>th</sup> edition (2002).

### 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 after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE