

MANUFACTURER DOCUMENT REFERENCE PACKAGE

Manufacturer's Manual

Selected official pages for procurement and maintenance review

PRODUCT BRAND

ABB

PRODUCT MODEL

NWIO-01 64168533

Watchdog digital I/O module. Selected NWIO instructions, safety information and configuration context.

OFFICIAL SOURCE

AC 800M DriveBus | 2PAA113566-600 | System Version 6.0 | August 2014

Open current manufacturer source

Original pages: 3-4, 9-10, 12, 24, 43-45 and 80-84. This is a selected extract, not the complete manual.
Adjacent module examples remain as original context; they are not NWIO-01 specifications.

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Amikon Limited prepared this independent reference package. Selected manufacturer pages follow with their original content and pagination visible.

AC 800M

AC 800M DriveBus

System Version 6.0

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Safety Summary

Introduction

The complete safety instructions stated in the appropriate ABB Drive Hardware Manual must be followed when installing, operating and servicing the frequency converters. Study the complete safety instructions carefully.

General Safety Instructions for AC and DC Drives

These general safety instructions include only main parts of the complete safety instructions. Neglecting these instructions may cause physical injury or death.



WARNING! All electrical installation and maintenance work on the drive should be carried out by qualified electricians.

Ground the drive, the motor and adjoining equipment to ensure personnel safety in all circumstances, and to reduce electromagnetic emission and pick-up.

Any installation work must be done with power off, and power is not to be reconnected unless the installation work is complete. Wait 5 minutes after switching off the supply before starting work. Always ensure by measuring that the drive is de-energized.

If the auxiliary voltage circuit of the drive is powered from an external power supply, opening the disconnecting device does not remove all voltages. Before starting work, check which circuits remain live after opening of the disconnecting device by referring to the circuit diagrams for your particular delivery. Ensure by measuring that the part of the cabinet you are working on is not live.

Do not make any voltage withstand tests on any part of the unit while the unit is connected.

Disconnect motor cables before making any measurements on motors or motor cables.

Live parts on the inside of doors are protected against direct contact. Special safety attention shall be paid when handling shrouds made of sheet metal.

Safety Summary

Check the cable connections at the shipping split joints before switching on the supply voltage.



WARNING! Close switch fuses of all parallel connected inverters before starting the frequency converter.

Do not open the drive section switch fuses when the inverter is running.

WARNING! Fans may continue to rotate for a while after the disconnection of the electrical supply.

WARNING! Some parts like heatsinks of power semiconductors and toroidal cores on motor cables inside of cabinet remain hot for a while after the disconnection of the electrical supply.

Warning and Caution Icons

This publication includes **Warning** and **Caution** where appropriate to point out safety related or other important information. The corresponding symbols should be interpreted as follows:



Electrical warning icon indicates the presence of a hazard which could result in *electrical shock*.



Caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in *corruption of software or damage to equipment/property*.

Although **Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, **fully comply** with all **Warning** and **Caution** notices.

Special I/O Channel



Special I/O will not be a part of the Control and I/O functionality in the System version 3.1 released and owned by ABB Automation Technology Products AB.

The CI858 Special I/O channel can be used to connect up to 12 I/O's per unit. The I/O channel is able to transfer 2 dataset pairs / 1 ms. The I/O units are connected in a ring topology.

The following I/O units are supported:

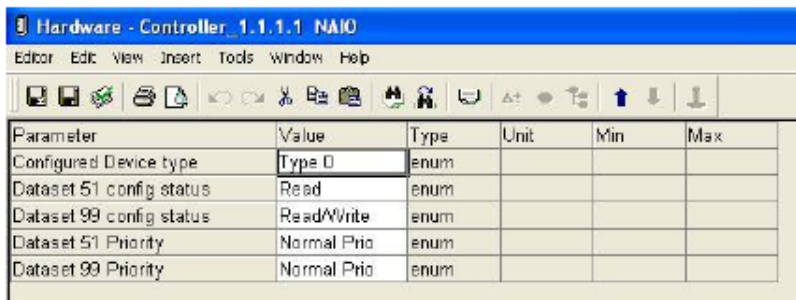
- NAIO-03 Analogue I/O Extension Module - contains 2 current or voltage inputs and 2 current outputs
- NBIO-21 Basic I/O Unit 2 - contains 3 digital inputs, 2 analogue inputs, 2 digital outputs and 2 analogue outputs
- NBIO-31 Basic I/O Unit 3 - contains 4 digital inputs and 3 digital outputs
- NCTI-01 Crane Transducer Interface
- NDIO-02 Digital I/O Extension Module - contains 2 digital inputs and 2 relay outputs
- NDSC-01 control board of the ACS600 Diode Supply
- NPCT-01 Pulse Counter and Timer Unit - contains 2 encoder inputs, 4 digital inputs, 4 digital outputs
- NTAC-02 Pulse Encoder Interface Module - contains an interface for a digital pulse encoder connection
- NWIO-01 Watchdog I/O Module - contains watchdog logic for supervising the operation of the software
- special I/O applications, see [Special I/O Parameters](#) on page 43

Special I/O Parameters

The following parameters can be specified in the Special I/O configuration editor in the Settings tab for the available Special I/O units: Special I/O Template, NBIO-21, NBIO-31, NWIO, NAO, NDIO, NTAC, NPCT, NDSC, NCTI.

Table 6. Special I/O parameters

Parameter	Selection	Description
Configured device type		Select the appropriate I/O type.
Initialization style for device		Parameter is set automatically according to the configured device type. In the Special I/O Template parameter is user-defined. Defines the ASIC type. Set parameter to 0 or 1. Select 1 if the ASIC is of the IOCC type.
MAFR Code		Major function code. Parameter is set automatically according to the configured device type. In the Special I/O Template parameter is user-defined. Defines whether the dataset is I/O or drive related. Set parameter to 0...255.
Overlaid datasets		Parameter is set automatically according to the configured device type. In the Special I/O Template parameter is user-defined. Set parameter to True or False. Select True if the returned dataset has the same dataset ID.
Dataset x ID	0...200	ABB Drive parameter index, which defines the Special I/O Template dataset ID.
Dataset x config status ⁽¹⁾	off/read/ read&write	Defines the dataset access in the Connections tab.
Dataset x priority	high priority / normal priority	Defines the dataset priority. It is possible to specify that 1-4 (depending on the drive type) datasets have higher communication priority than the others.
⁽¹⁾ Configuration status for datasets for reading digital inputs are marked with R (read) and dataset for reading and writing digital outputs are marked with R/W (read and write).		



The screenshot shows a software window titled "Hardware - Controller_1.1.1.1 NAOIO". It has a menu bar with "Editor", "Edit", "View", "Insert", "Tools", "Window", and "Help". Below the menu is a toolbar with various icons. The main area contains a table with the following data:

Parameter	Value	Type	Unit	Min	Max
Configured Device type	Type 0	enum			
Dataset 51 config status	Read	enum			
Dataset 99 config status	Read/Write	enum			
Dataset 51 Priority	Normal Prio	enum			
Dataset 99 Priority	Normal Prio	enum			

Figure 12. NAOIO parameter window.

Special I/O Template

With Special I/O Template, the dataset numbers are user-defined.

Connections

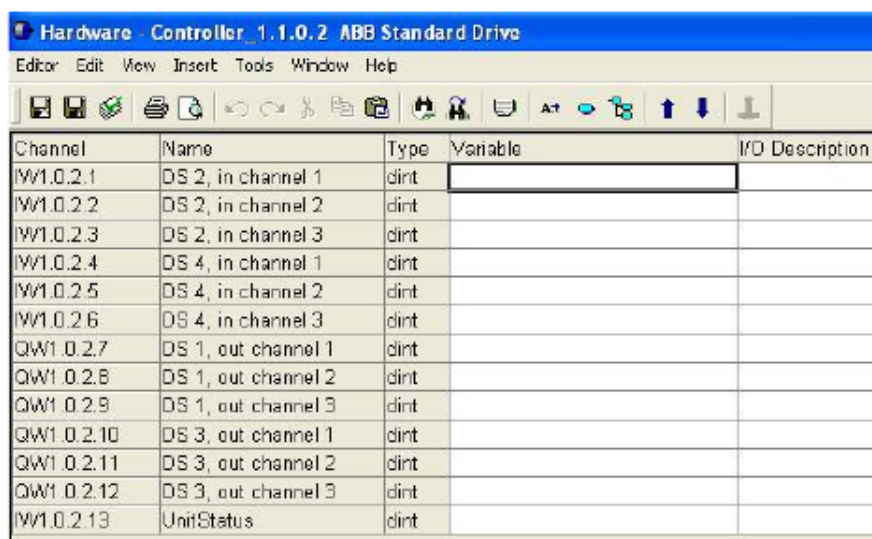
Variables are connected to the input and output dataset channels in the connections window shown below.



All connected variables must be in the same task: All connected, accessed variables will be copied to the same task. All connected, unaccessed variables will be copied to a background task.

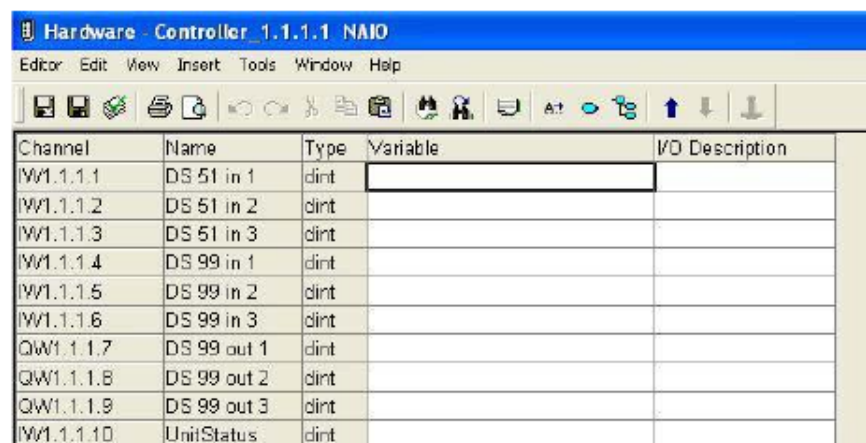


When dataset access is defined as Read&Write, variables of at least one input channel and one output channel must be connected. With Read only datasets variables of all three input channels must be connected.



Channel	Name	Type	Variable	I/O Description
IW1.0.2.1	DS 2, in channel 1	dint		
IW1.0.2.2	DS 2, in channel 2	dint		
IW1.0.2.3	DS 2, in channel 3	dint		
IW1.0.2.4	DS 4, in channel 1	dint		
IW1.0.2.5	DS 4, in channel 2	dint		
IW1.0.2.6	DS 4, in channel 3	dint		
QW1.0.2.7	DS 1, out channel 1	dint		
QW1.0.2.8	DS 1, out channel 2	dint		
QW1.0.2.9	DS 1, out channel 3	dint		
QW1.0.2.10	DS 3, out channel 1	dint		
QW1.0.2.11	DS 3, out channel 2	dint		
QW1.0.2.12	DS 3, out channel 3	dint		
IW1.0.2.13	UnitStatus	dint		

Figure 13. ABB Standard Drive connections window.



Channel	Name	Type	Variable	I/O Description
IW1.1.1.1	DS 51 in 1	dint		
IW1.1.1.2	DS 51 in 2	dint		
IW1.1.1.3	DS 51 in 3	dint		
IW1.1.1.4	DS 99 in 1	dint		
IW1.1.1.5	DS 99 in 2	dint		
IW1.1.1.6	DS 99 in 3	dint		
QW1.1.1.7	DS 99 out 1	dint		
QW1.1.1.8	DS 99 out 2	dint		
QW1.1.1.9	DS 99 out 3	dint		
IW1.1.1.10	UnitStatus	dint		

Figure 14. NAI0 connection window.

NWIO

NWIO-01 Watchdog & I/O is a digital I/O option unit. It contains a watchdog logic for supervising the operation of the AC 800M and the CI858 software. The unit has two digital inputs (24 VDC or 115/230 VAC) and two digital outputs. Using a slide switch on the top of the unit, the watchdog logic can be connected to control the state of the digital output DO2.

The watchdog supervises the following operations of the CI858:

- Functioning of the CI858 application program.
- Communication over the dual port memory.
- Functioning of the CI858 operative system.
- Communication on the optical I/O ring.

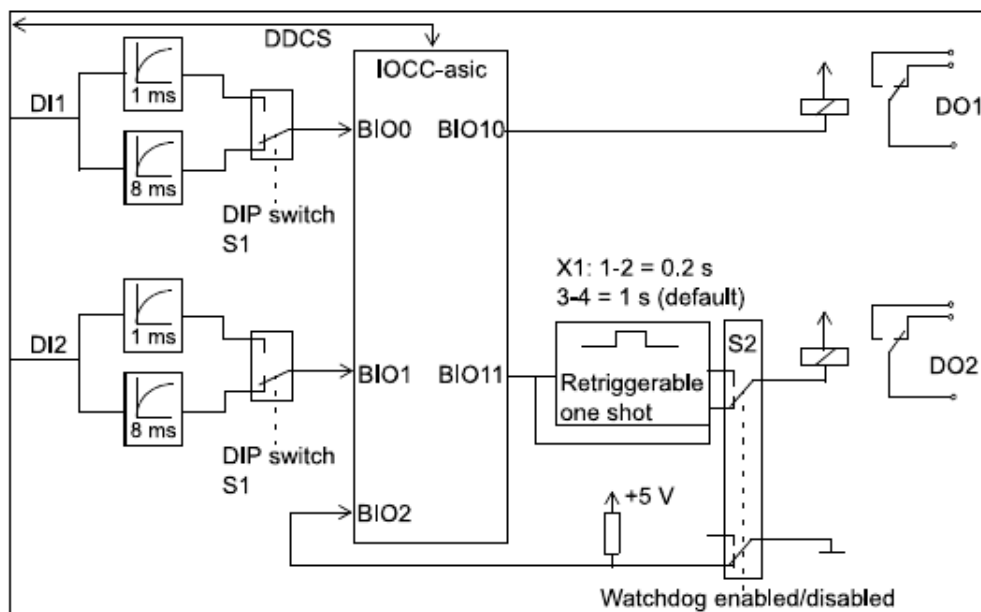


Figure 16. Simplified block diagram of the NWIO-01 unit.

There are two function blocks for handling the NWIO-01 unit: NWIO1DI and NWIO1DO.

NWIO1DI

Function block NWIO1DI is used for reading digital input signals from the NWIO-01 unit.

The actual selection of the I/O unit is made in the Control Builder's hardware editor by connecting respective channels of the NWIO unit to input signals 5...8 (inword1... UnitStatus). See [Table 35](#) and [Connections](#) on page 44.

Table 35. Input and output signals of NWIO1DI.

No	Name	Direction	Data type	Description
1	DI1	out	bool	Output for digital input DI1.
2	DI2	out	bool	Output for digital input DI2.
3	WD_STAT	out	bool	Selection of WatchDog function. 0 = not selected, 1 = selected
4	ERR	out	bool	Communication status. 1 = Error See Output Error on page 84.
5	Inword1	in	dint	First input word of DS 100 (R).
6	Inword2	in	dint	Second input word of DS 100 (R).
7	Inword3	in	dint	Third input word of DS 100 (R).
8	UnitStatus	in	dint	Unit status.

NWIO1DO

Function block NWIO1DO is used for writing digital output signals to the NWIO-01 unit.

The actual selection of the I/O unit is made in the Control Builder's hardware editor by connecting respective channels of the NDIO unit to input and output signals 5...9 (outword1... UnitStatus). See [Table 36](#) and [Connections](#) on page 44.

Table 36. Input and output signals of NWIO1DO.

No	Name	Direction	Data type	Description
1	DO1	in	bool	Input for digital output DO1
2	DO2	in	bool	Input for digital output DO2.
3	WD_SEL	in	bool	Selection of the DO2 operation mode. DO2 can be used as normal software controlled digital output or as a watchdog output.
4	ERR	out	bool	Communication status. See Output Error on page 84.
5	outword1	out	dint	First output word of DS 100 (R/W).
6	outword2	out	dint	Second output word of DS 100 (R/W).
7	outword3	out	dint	Third output word of DS 100 (R/W).
8	inword1_dummy	in	dint	First input word (=dummy) of DS 100 (R/W).
9	UnitStatus	in	dint	Unit status

Digital output DO2 can be used as a normal software controlled digital output or as a watchdog output. The operation mode is selected with the WATCHDOG ENABLED / DISABLED switch on the top of the unit and with input signal WD_SEL. In watchdog mode, a retriggerable one shot circuit is connected between the software controlled output and the actual output relay. Changing the state of digital output DO2 refreshes the one shot circuit (software oscillator is made by the inverter element).

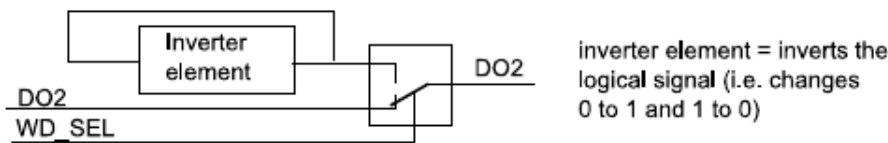


Figure 17. Watchdog operation.

The factory setting of the watchdog time constant is 1 s but it can be shortened to 0.2 s with jumper X1 inside the unit (X1, pins 1-2 = 0.2 s; pins 3-4 = 1 s).

The cycle time of the oscillator is $2 \times$ execution interval of the NWIO1DO. The cycle time must be fast enough compared with the time constant selection in the NWIO-01 unit.

Time constant 1 s: Execution interval of the task ≤ 100 ms, thus the cycle time of the oscillator is ≤ 200 ms.

Time constant 0,2 s: Execution interval of the task ≤ 20 ms, thus the cycle time of the oscillator is ≤ 40 ms.

NCTI

For information about the NCTI-01 Crane Transducer Interface see *Crane transducer Interface User's manual [3ASC23F207 (English)]*.

NDSC

NDSC-01 is the control board of the ACS600 Diode Supply Unit. For more information see *ACA 631/633 Diode Supply Section User's Manual [3AFY 61451544 (English)]*.

Configuration of the NDSC board is similar to the configuration of a drive.

Output Error

When a communication error is detected in the cyclic DDCS message, output ERR is set according to the UnitStatus signal. Output ERR is cleared when an acknowledgement to the cyclic DDCS message without any errors is received from the I/O unit and old error indications are acknowledged.

Table 37. Output error (derived from UnitStatus).

Unit status	Error	Description
0	0	No errors detected.
1	1	Communication fails
2	1	Unacknowledged alarm or forced operation (i.e. output signal is forced to a value defined by the user in the hardware editor)