MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

ABB

AIMA-01

I/O EXTENSION MODULE ADAPTER

Used with the applicable ABB drive I/O extension configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: ABB AIMA-01 I/O Module Adapter User's Manual, 3AFE64661442 Rev A

Safety instructions

Overview

This chapter states the general safety instructions that must be followed when installing and operating the AIMA-01 I/O Module Adapter.

The material in this chapter must be studied before attempting any work on the unit.

In addition to the safety instructions given below, read the complete safety instructions of the specific drive you are working on.

General safety instructions



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

The drive and adjoining equipment must be properly earthed.

Do not attempt any work on a powered drive. After switching off the mains, always allow the intermediate circuit capacitors 5 minutes to discharge before working on the frequency converter, the motor or the motor cable. It is good practice to check (with a voltage indicating instrument) that the drive is in fact discharged before beginning work.

The motor cable terminals of the drive are at a dangerously high voltage when mains power is applied, regardless of motor operation.

There can be dangerous voltages inside the drive from external control circuits even when the drive mains power is shut off. Exercise appropriate care when working on the unit. Neglecting these instructions can cause physical injury or death.

AIMA-01 I/O Module Adapter

Overview

The AIMA-01 I/O Module Adapter is an extension unit for the mounting of I/O extension modules, such as RDIO-01, RAIO-01 and RTAC-01, outside the drive unit. The AIMA-01 is connected to the drive via a DDCS-protocol fibre optic link. Up to three I/O extension modules can be mounted on one AIMA-01 adapter. Several AIMA-01 adapters can be connected in a ring topology using fibre optic cable.

Optical component types

ABB drive products in general utilise 5 and 10 MBd (megabaud) optical components from Agilent Technologies' (Hewlett-Packard) Versatile Link range. Please note that the optical component type is not directly related to the actual communication speed. The AIMA-01 has both a 5 MBd and a 10 MBd component channel. Only one channel can be used at a time.

Note: The optical components (transmitter and receiver) on a fibre optic link must be of the same type.

Plastic optical fibre (POF) cables can be used with both 5 MBd and 10 MBd optical components. 10 MBd components also enable the use of Hard Clad Silica (HCS®) cables, which allow longer connection distances thanks to their lower attenuation. HCS® cables cannot be used with 5 MBd optical components. HCS® is a registered trademark of SpecTran Corporation.

The optical component types used in ABB drive equipment are presented in sub-section *Settings and connections*.

Cable length and optical power setting

Because of the narrow optical dynamic operating area of 5 MBd components, the optical power (light intensity) of the transmitters must be set in accordance to the cable attenuation, which in turn depends on cable type and length. Incorrect optical power can either underdrive or overdrive the receiver, resulting in a disturbed signal. It should also be noted that if the optical power is set too low or high, an initially working link may cause problems later, e.g. when the ambient temperature changes and the optical components age.

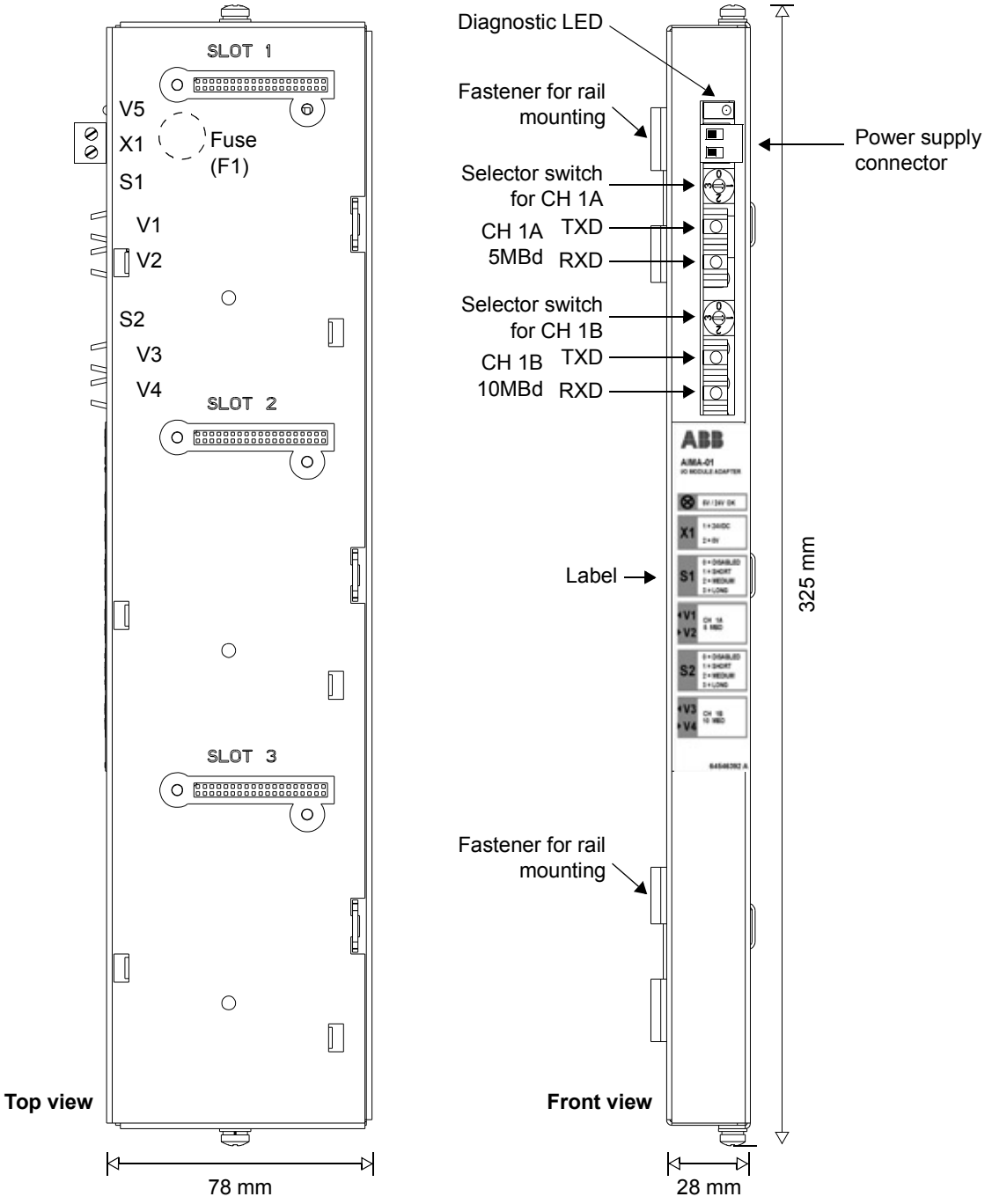
The wider dynamic range of 10 MBd components allows the use of maximum optical power regardless of cable length. However, this is not recommended since high transmitter current shortens its lifetime, and the additional heat generation in the driver components may lead to reduced reliability.

Each optical channel on the AIMA-01 has an individual rotary selection switch for the transmitter power setting. The position should be set depending on the cable type and length as explained under sub-section *Settings and connections* below.

Settings and connections

Layout

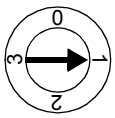
The following figure shows the layout and dimensions of the AIMA-01, indicating three slot positions and front components such as the diagnostic LED, fibre optic transmitter/receiver, power supply connector, fuse and selector switches.



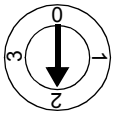
Optical power (S1/S2)

Each fibre optic channel has a rotary selection switch on the circuit board of the AIMA-01 to select the optical power level and to disable the transceiver (TXD). The selector should be set according to the length (or attenuation) of the cable as shown below.

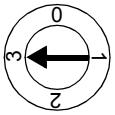
Note: Set the selector to the Disabled position on the disconnected channel to reduce heat generation.



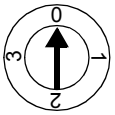
Short



Medium
(Default for CH 1A)



Long



Disabled
(Default for CH 1B)

Recommended settings:

Optical component type	Transmission speed	Cable type	Cable length [m]	Optical power setting
5 MBd	1 MBit/s	POF	0.1 … 5	Short
			(2) 5 … 10	Medium
			(5) 10 … 15	Long
	2 or 4 MBit/s	POF	0.1 … 4	Short
			(2) 4 … 7	Medium
			(5) 7 … 10	Long
10 MBd	–	POF	0.1 … 5	Short
			(0.1) 5 … 20	Medium
			(0.1) 5 … 30	Long
		HCS®	0.1 … 50	Medium
			(0.1) 50 … 200	Long

Power supply (X1)

The AIMA-01 requires a supply voltage of 24 V DC ±10%. The connection is protected by means of fuse F1 and is galvanically isolated from earth and the logic circuitry.

Diagnostic LED

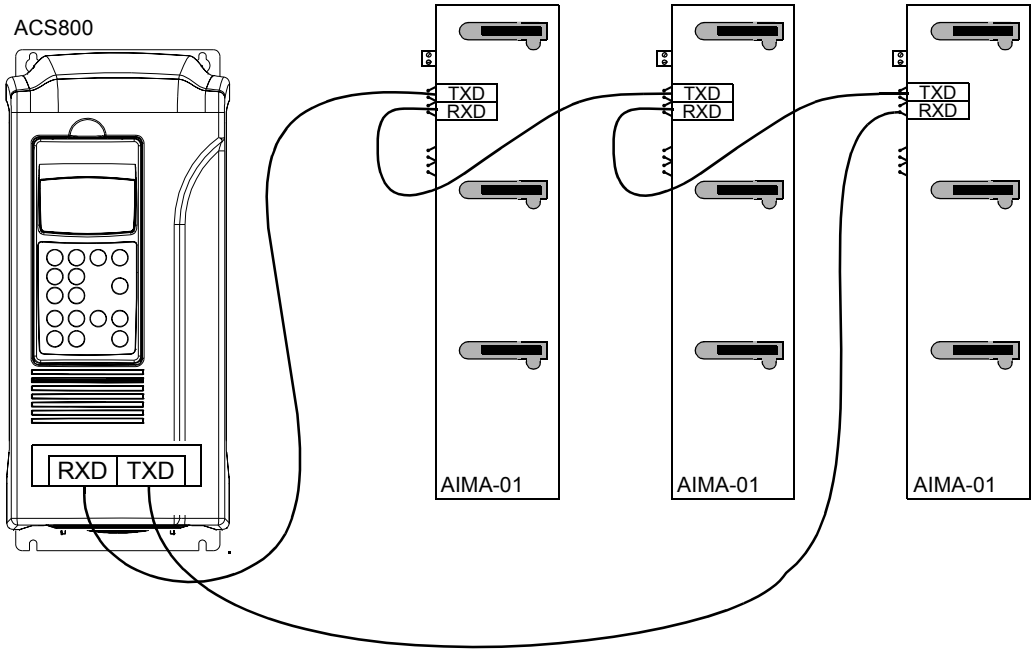
The diagnostic LED V1 on the circuit board of the AIMA-01 unit can be viewed on the front of the metal housing.

The *+5V OK* LED indicates that the logic circuitry of the AIMA-01 is receiving its supply voltages of 5 V and 24 V. This LED should be illuminated when the AIMA-01 is powered.

Fibre optic link connection

Connect the TXD connector of CH 1A or CH 1B to the RXD connector of the I/O Extension channel (see the drive documentation) of the drive. Connect the RXD connector of CH 1A or CH 1B to the TXD connector of the I/O Extension channel (see the drive documentation) of the drive.

Multiple AIMA-01 I/0 Module Adapters are connected together in a ring topology as shown below.

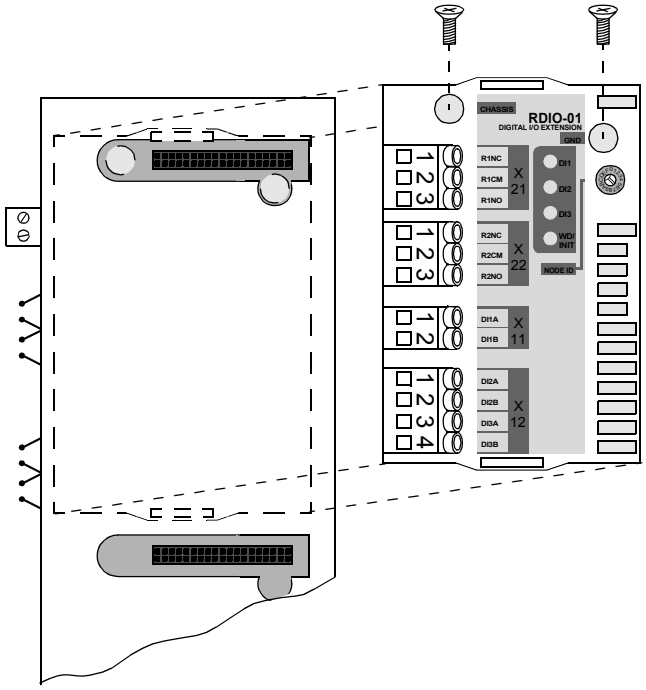


Mechanical installation

The housing of the AIMA-01 unit has two spring-loaded fasteners for vertical or horizontal 35 × 7.5 mm DIN rail mounting. The mounting rail must be earthed to a noiseless earth. If the rail is not mounted on a properly earthed base, a separate earthing conductor must be used. The conductor must be as short as possible and its cross-sectional area must be 6 mm^2 at least. **Note:** No solid copper conductor may be used (stranded wire allowed only).

The unit should be mounted so that air can freely pass through the ventilation holes in the housing. Mounting directly above heat-generating equipment should be avoided.

The mounting of the I/O extension modules is shown in the figure below. Refer to the corresponding User's Manuals.



Technical data, AIMA-01

Housing: Zinc-plated sheet steel

Dimensions:
Housing: 78 × 325 × 28 mm
Circuit board: 70 × 220 mm

Mounting: Onto 35 × 7.5 mm DIN rail

Power supply connection:
Voltage: 24 V DC ±10%
Current consumption: Refer to I/O extension module's User's Manual.
Fuse: TR5, T1 A (anti-surge)

Connectors:
CH 1A: Agilent Technologies (Hewlett-Packard) Versatile Link Series (5 MBd)
CH 1B: Agilent Technologies (Hewlett-Packard) Versatile Link Series (10 MBd)
Power supply: Detachable screw terminal block (Phoenix Contact MSTBA 2.5/2-G-5.08)

LED:
+5V OK (logic voltage OK)

Ambient conditions:

Environmental limits for the adapter are given below. The adapter is to be used in a heated, indoor, controlled environment.

	Operation installed for stationary use	**Storage** in the protective package	**Transportation** in the protective package
Installation site altitude	0 to 4000 m (13123 ft) above sea level	-	-
Air temperature	0 to +50 °C (32 to 122 °F)	-20 to +70 °C (-4 to +158°F)	-20 to +70 °C (-4 to +158°F)
Relative humidity	5 to 95%	Max. 95%	Max. 95%
	No condensation allowed. Maximum allowed relative humidity is 60% in the presence of corrosive gases.		
Contamination levels (IEC 60721-3-3)	No conductive dust allowed.		
	Boards without coating: Chemical gases: Class 3C1 Solid particles: Class 3S2 **Boards with coating:** Chemical gases: Class 3C2 Solid particles: Class 3S2	**Boards without coating:** Chemical gases: Class 1C2 Solid particles: Class 1S3 **Boards with coating:** Chemical gases: Class 1C2 Solid particles: Class 1S3	**Boards without coating:** Chemical gases: Class 2C2 Solid particles: Class 2S2 **Boards with coating:** Chemical gases: Class 2C2 Solid particles: Class 2S2
Atmospheric pressure	70 to 106 kPa 0.7 to 1.05 atmospheres	70 to 106 kPa 0.7 to 1.05 atmospheres	60 to 106 kPa 0.6 to 1.05 atmospheres
Vibration (IEC 60068-2)	Max. 1 mm (0.04 in.) (5 to 13.2 Hz), max. 7 m/s^2 (23 ft/s^2) (13.2 to 100 Hz) sinusoidal	Max. 1 mm (0.04 in.) (5 to 13.2 Hz), max. 7 m/s^2 (23 ft/s^2) (13.2 to 100 Hz) sinusoidal	Max. 3.5 mm (0.14 in.) (2 to 9 Hz), max. 15 m/s^2 (49 ft/s^2) (9 to 200 Hz) sinusoidal
Shock (IEC 60068-2-29)	Not allowed	Max. 100 m/s^2 (330 ft./s^2), 11 ms	Max. 100 m/s^2 (330 ft./s^2), 11 ms
Free fall	Not allowed	250 mm (10 in.) for weight under 100 kg (220 lb) 100 mm (4 in.) for weight over 100 kg (220 lb)	250 mm (10 in.) for weight under 100 kg (220 lb) 100 mm (4 in.) for weight over 100 kg (220 lb)

Degree of protection: IP20

EMC: Complies with EMC standards EN 50081-2 and EN 50082-2.