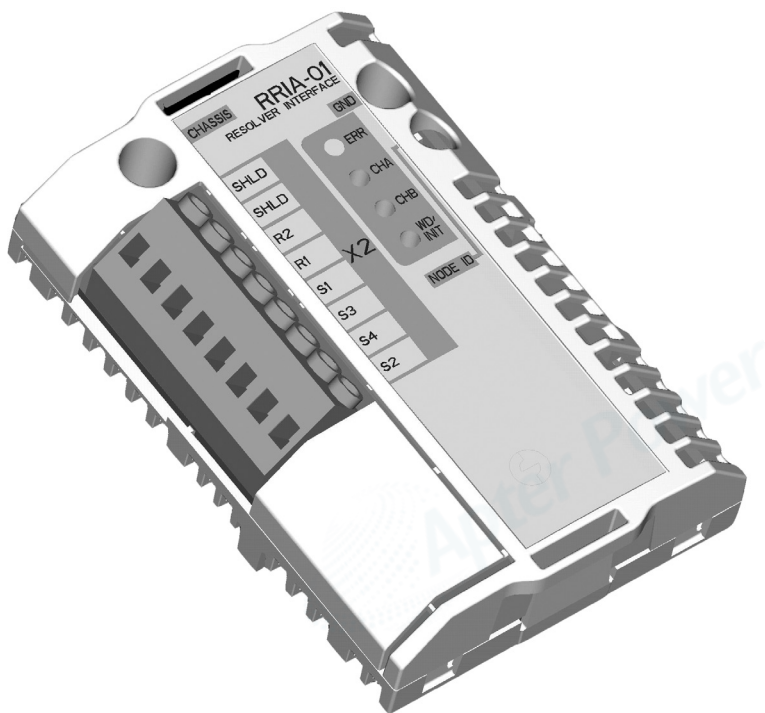


ABB Drives

User's Manual Resolver Interface Module RRIA-01



Overview

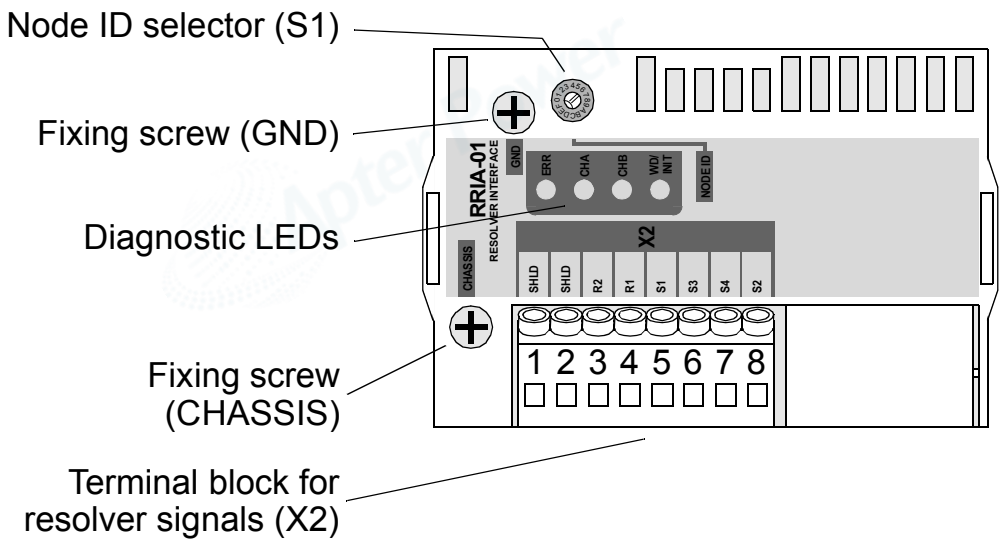
Overview

This chapter contains a short description of the RRIA-01 Resolver Interface module and a delivery checklist.

The RRIA-01 module

The RRIA-01 Resolver Interface module offers an interface for an analogue resolver connection. A resolver is used to obtain accurate speed or position (angle) feedback from the motor shaft.

Module layout



Delivery check

The option package contains:

- RRIA-01 module
- Two screws (M3×8 mm)
- This manual.

Compatibility

The RRIA-01 is compatible with

- ACS800 Motion Control Application Program version APXR7000 or later,
- ACS800 Permanent Magnet Synchronous Machine Drive Application Program for Standard Application Program version AQPM7040 or later, and
- ACS800 Permanent Magnet Synchronous Machine Drive Application Program for System Application Program version ANXR7100 or later.

Installation



WARNING! Follow the safety instructions given in this guide and the drive manuals.

Mounting

The RRIA-01 is to be inserted into the position marked SLOT 1 or SLOT 2 on the drive. The module is held in place with plastic retaining clips and two screws. The screws also provide the earthing of the I/O cable shield connected to the module, and interconnect the GND signals of the module and the RMIO board.

On installation of the module, the signal and power connection to the drive is automatically made through a 38-pin connector.

The module can alternatively be mounted on a DIN rail-mountable AIMA-01 I/O Module Adapter.

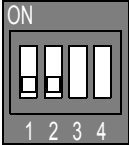
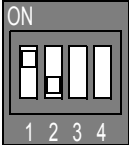
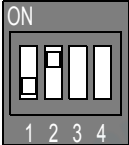
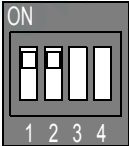
Mounting procedure:

1. Insert the module carefully into SLOT 1 or SLOT 2 on the RMIO board until the retaining clips lock the module into position.
2. Fasten the two screws (included) to the stand-offs.

Note: Correct installation of the screws is essential for fulfilling the EMC requirements and for proper operation of the module.

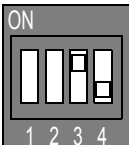
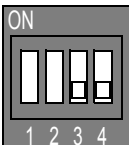
Setting the number of pole pairs

The number of pole pairs of the resolver is to be set using switch S2 as follows:

Number of pole pairs	DIP switch setting
1	
2	
3	
4	

Setting the excitation frequency

The resolver excitation frequency is to be selected using switch S2 as follows:

Excitation frequency	DIP switch setting
10 kHz	
20 kHz	

Terminal designations

X2	Marking	Description
1	SHLD	For earthing of the resolver cable shields. Internally connected to the frame.
2	SHLD	
3	R2	Excitation voltage Frequency: 10 or 20 kHz (selected by DIP switch S2:3 and S2:4 – see section “ <i>Setting the excitation frequency</i> ” above) Maximum output voltage: 12 V _{pp} Outputs and inputs are isolated from the logic, and the power supply For a resolver recommendation, see page 24.
4	R1	Output common. Connected via an RC filter to the frame.
5	S1	Cosine winding input 1
6	S3	Cosine winding input 2
7	S4	Sine winding input 1
8	S2	Sine winding input 2

Resolver wiring

General

The resolver should be connected to the RRIA-01 module with a cable specified below.

Cable construction	4 × (2+1) Twisted pair cable with individual and overall shields.
Conductor cross-sectional area	0.5 to 1.0 mm ²
Maximum cable length	100 m

Note: The cable shields should be earthed only at the RRIA module if the resolver is not isolated from the motor and earth. However, if the resolver is isolated from the motor and earth, the cable shields are to be connected to the resolver housing also.

Note: Do not route the resolver cables parallel to power (eg. motor) cables.

Phasing

When the resolver is connected correctly, running the drive in the *Forward* (positive speed reference) direction should produce a positive resolver speed feedback.

Node address selection

Setting the node ID is not required when the module is mounted into SLOT 1 or SLOT 2 on the drive.

If the RRIA-01 module is mounted onto external I/O Module Adapter AIMA-01, choose the proper node ID for the module using the node ID selector (S1).

The settings 0 ... F correspond to node IDs 16 ... 31. The default setting is 0 (node ID 16).

Programming

The RRIA-01 is programmed through drive parameters. These parameters must be checked and adjusted. For further information, see the drive *Firmware Manual*, Parameter Groups 50 and 98.



Fault tracing

Diagnostic LEDs

There are four diagnostic LEDs on the RRIA-01 module.

CHA, CHB (Green)

These LEDs show the activity on channels A and B as generated from the resolver output signal.

WD/INIT (Yellow)

This LED shows the status of the module. The LED is lit when the drive is configuring the module at power-up. It can also be lit after power-up if an error occurs in the communication between the drive and the RRIA-01 (see *Option slot installation* below).

ERR (Red)

This LED lights when the module receives an abnormal signal from the resolver, indicating one of the following:

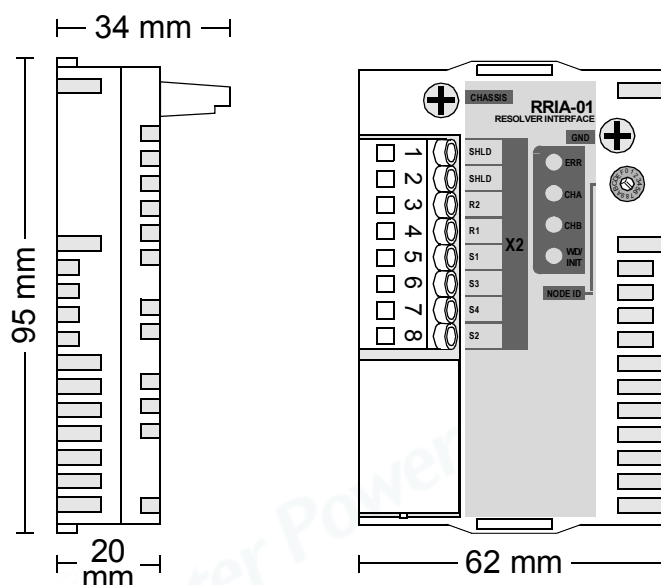
- Loss of excitation signal (R1 and R2). Possible causes:
 - Bad connection or short-circuit in the wiring
 - Failure of the excitation circuit of the RRIA-01 module.
- Loss of resolver signal (S1 to S4) because of a bad connection, or a short-circuit between the S1-S3 and S2-S4 lines during rotation.

The ERR LED is also lit in case of an error is encountered during the internal self-test of the module.

Technical data

RRIA-01 data

Dimensions:



Mounting: Into an option slot of the RMIO board of the drive or onto external I/O Module Adapter (AIMA-01).

Degree of protection: IP20

Ambient conditions: The applicable ambient conditions specified for the drive in its *Hardware Manual* are in effect.

Hardware settings: Rotary switch for node ID selection (range 16...31)

Connectors:

- 38-pin parallel bus connector
- One 8-pole non-detachable screw-type terminal block for max. 2.5 mm² wire.

Max. power consumption: 180 mA (5 V) + 80 mA (24 V)

Estimated min. lifetime: 100 000 h

Resolver interface:

- Signal levels:
- Output: 12 V_{pp} at 10 or 20 kHz AC
- Inputs: 8 V_{pp} at 10 or 20 kHz
- Frequency: 20 kHz (max.)
- Position feedback resolution: 0.024% (12 bits)
- Maximum resolver cable length: 100 m
- Isolated from the logic and earth. Test voltage: 1.5 kV AC, 1 minute

Miscellaneous:

- All materials UL/CSA-approved
- Complies with EMC standards EN 50081-2 and EN 50082-2

Resolver recommendation

Input voltage and frequency: 7 V rms, 10 kHz

Transformation ratio: $0.5 \pm 5\%$

Impedance:

- Between R1 and R2 with open outputs (Z_{RO}): 190 ohms
- Between R1 and R2 with short circuits between S1 and S3 as well as between S2 and S4 (Z_{RS}): –
- Between S2 and S4 in a position of 0° (minimal coupling) with open outputs (Z_{SO}): 300 ohms
- Between S1 and S3 in a position of 0° (maximal coupling) with short circuits between R1 and R2 (Z_{SS}): 270 ohms