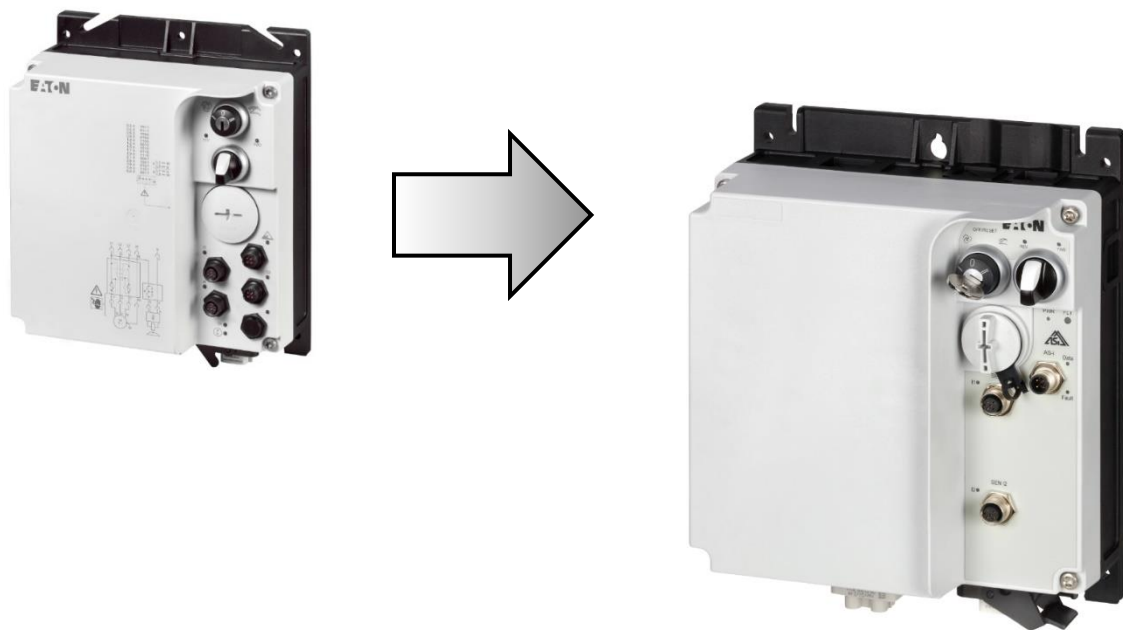


Rapid Link 5

RAMO5

Generation Change of RAMO 4.0 to RAMO5



<p>Level 3</p>	<p>1 – Fundamental – No previous experience necessary 2 – Basic – Basic knowledge recommended 3 – Advanced – Reasonable knowledge required 4 – Expert – Good experience recommended</p>
----------------	--

All proprietary names and product designations are brand names or trademarks registered to the relevant title holders.

Break-Down Service

Please call your local representative:

Eaton.eu/aftersales

Eaton.com/us/en-us/support.html

Hotline After Sales Service:

+49 (0) 1805 223822 (de, en)

AfterSalesEGBonn@eaton.com

Original Application Note is the English version of this document.

All non-English language versions of this document are translations of the original application note.

1. Edition 2020, publication date 07/2020

2. Edition 2020, publication date 09/2020

Copyright

©2020 by Eaton Industries GmbH, 53115 Bonn

All rights reserved, also for the translation.

No part of this application note may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, micro-filming, recording or otherwise, without the prior written permission of Eaton Industries GmbH, Bonn.

Subject to alteration.

Content

- 1 General..... 6
- 2 Dimensions 6
- 3 AS-i Profile 6
- 4 Replacement Sequence..... 6
- 5 Parameterization Software, Keypad and App 7
- 6 Sensor Inputs and general comparison 8
- 7 Motor Plug and Motor Cable..... 8
- 8 DIP Switch Setting vs. Parameter Settings 9
 - 8.1 DIP Switch 1.1-1.4 vs P1-08 (Motor Nominal Current)..... 9
 - 8.2 DIP 1.5 vs P3-06...09 (Sensor Input Configuration)10
 - 8.3 DIP 1.6 and 1.8 vs P1-13 (Quick stop and interlocked manual operation)10
 - 8.4 DIP 1.7 vs P6-08 (Change phase sequence motor)12
 - 8.5 DIP 1.9 vs P6-05 (Monitoring the current lower limit)12
 - 8.6 DIP 1.10 vs P6-05 (AS-interface diagnostics)12
 - 8.7 Wire Jumper vs P2-27 (Thermistor fault response).....12
 - 8.8 DIP Switch 3.1 vs P5-10 (quick stop suppression)13
- 9 Parameters RAMO5.....14
- 10 Requirements for Parametrization and PLC Communication16
 - 10.1 PLC Communication.....16
 - 10.2 Parametrization16
- 11 Power Consumption from ASI power supply16
- 12 Firmware Update.....16
- 13 References.....18

Danger! - Dangerous electrical voltage!

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Cover or enclose any adjacent live components.
- Follow the engineering instructions (AWA/IL) for the device concerned.
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE, PES) must be connected to the protective earth (PE) or the potential equalization. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference does not impair the automatic control functions.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that an open circuit on the signal side does not result in undefined states.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specification, otherwise this may cause malfunction and/or dangerous operation.
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes. Unlatching of the emergency-stop devices must not cause a restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been properly installed and with the housing closed.
- Wherever faults may cause injury or material damage, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (e.g. by means of separate limit switches, mechanical interlocks etc.).
- Motor starter may have hot surfaces during and immediately after operation.
- Removal of the required covers, improper installation or incorrect operation of motor or motor starter may destroy the device and may lead to serious injury or damage.
- The applicable national safety regulations and accident prevention recommendations must be applied to all work carried on live motor starter.
- The electrical installation must be carried out in accordance with the relevant electrical regulations (e. g. with regard to cable cross sections, fuses, PE).
- Transport, installation, commissioning and maintenance work must be carried out only by qualified personnel (IEC 60364, HD 384 and national occupational safety regulations).
- Installations containing motor starter must be provided with additional monitoring and protective devices in accordance with the applicable safety regulations. Modifications to the motor starter using the operating software are permitted.
- All covers and doors must be kept closed during operation.
- To reduce the hazards for people or equipment, the user must include in the machine design measures that restrict the consequences of a malfunction or failure of the motor starter (increased motor speed or sudden standstill of motor). These measures include: – Other independent devices for monitoring safety related variables (speed, travel, end positions etc.). – Electrical or non-electrical system-wide measures (electrical or mechanical interlocks). – Never touch live parts or cable connections of the motor starter after it has been disconnected from the power supply. Due to the charge in the capacitors, these parts may still be alive after disconnection. Consider appropriate warning signs.

Disclaimer

The information, recommendations, descriptions, and safety notations in this document are based on Eaton's experience and judgment and may not cover all contingencies. If further information is required, an Eaton sales office should be consulted. Sale of the product shown in this literature is subject to the terms and conditions outlined in the applicable Terms and Conditions for Sale of Eaton or other contractual agreement between Eaton and the purchaser. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, OTHER THAN THOSE SPECIFICALLY SET OUT IN ANY EXISTING CONTRACT BETWEEN THE PARTIES. ANY SUCH CONTRACT STATES THE ENTIRE OBLIGATION OF EATON. THE CONTENTS OF THIS DOCUMENT SHALL NOT BECOME PART OF OR MODIFY ANY CONTRACT BETWEEN THE PARTIES. As far as applicable mandatory law allows so, in no event will Eaton be responsible to the purchaser or user in contract, in tort (including negligence), strict liability, or otherwise for any special, indirect, incidental, or consequential damage or loss whatsoever, including but not limited to damage or loss of use of equipment, plant or power system, cost of capital, loss of power, additional expenses in the use of existing power facilities, or claims against the purchaser or user by its customers resulting from the use of the information, recommendations, and descriptions contained herein. The information contained in this manual is subject to change without notice.

1 General

The following information indicates the differences that must be considered when expanding systems or creating new projects with RAMO5 units, as well as when using them to replace RAMO 4.0 devices.

The generation change has the following major differences:

- **Parameter software, parameters, keypad and app functionality**
- **DIP-Switches to parameter software - sensors and thermistor settings**
- **No AS-I connection required for RAMO5 in manual mode**

The controls' handling remains the same.

2 Dimensions

There is no difference between RAMO 4.0 and RAMO5 regarding dimensions. The mechanical system setup doesn't need to be changed respectively dimensions.

3 AS-I Profile

RAMO 4.0 units have the same AS-I profile as RAMO5 (AS-Interface Profile S-7.4 and S-7.A.E).

Same as RAMO 4.0 the new generation RAMO5 has 2 different types of AS-I variants.

The corresponding device needs to be ordered. The master (gateway) doesn't need to carry out a new initialization.

4 Replacement Sequence

Proceed following steps for a proper replacement.

1. Turn key and selector switch (FWD/REV) to '0' Position (RAMO 4.0 and RAMO5)
2. Note the DIP-positions of the RAMO 4.0
3. Read the address from RAMO 4.0 (with addressing device)
4. Disconnect motor-, energy-, AS-I, sensor connectors from RAMO 4.0
5. Set parameters of the RAMO5 accordingly (with Keypad, app or drivesConnect)
6. Settings for the DIP switches must be transferred to RAMO5 (see table in chapter Special Settings below)
7. Give the address of RAMO 4.0 to the RAMO5
8. Connect all cables, line 400 V AC, AS-I, motor and sensors.
9. Ready to start.



Notice!

Before Power On it must be ensured that the motor and the motor cable is properly connected.

5 Parameterization Software, Keypad and App

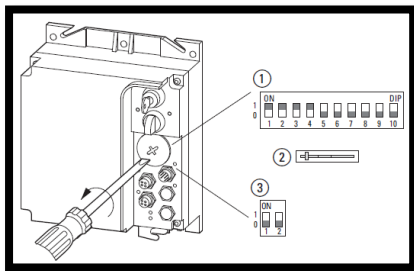


Figure 2: DIP switches for RAMO 4.0

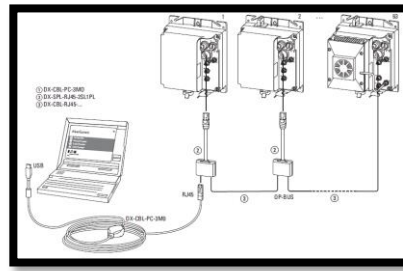


Figure 3: PC connection to RAMO5

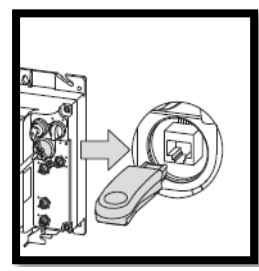






Figure 1: Bluetooth connection to RAMO5

The table below shows the difference between RAMO 4.0 and RAMO5 regarding PC software, PC cable, keypad and smartphone app.

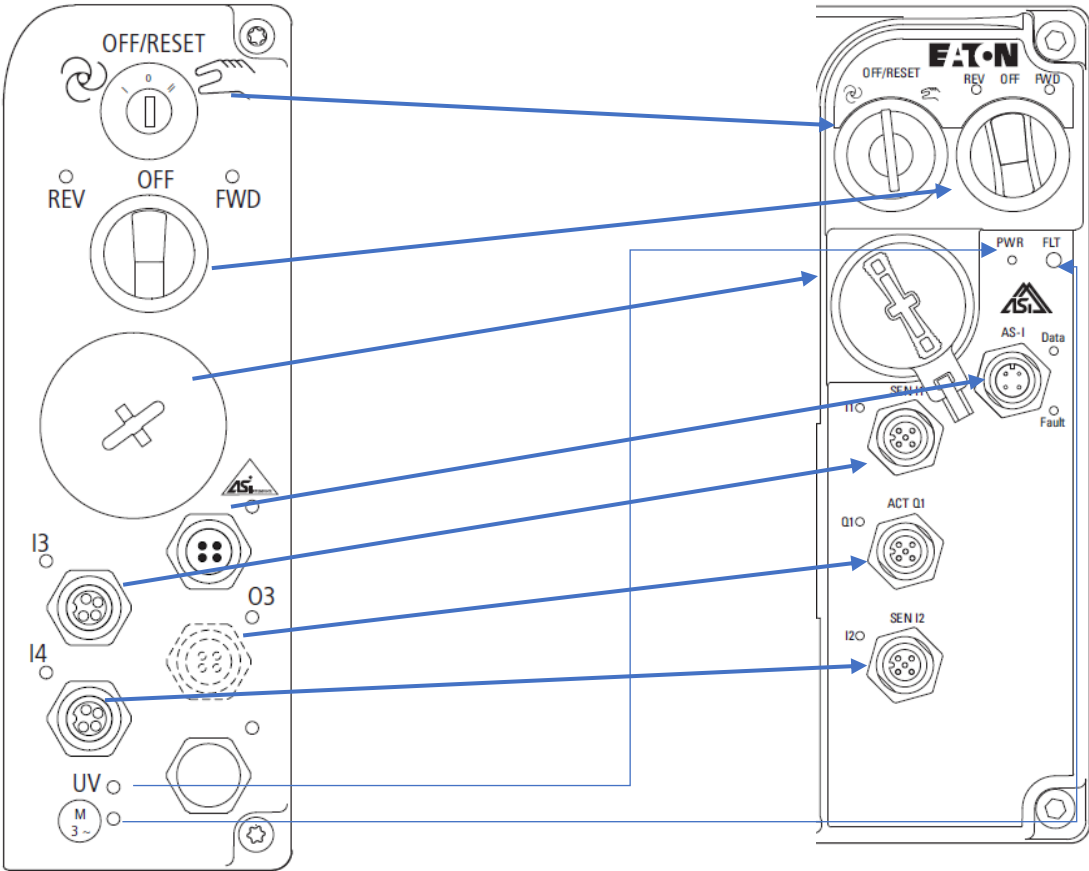
	RAMO 4.0	RAMO5
Parameterization PC Software	DIP Switch 	drivesConnect 
Remote Keypad	Not supported	DX-KEY-OLED 
PC - Connection	Not supported	DX-CBL-PC-3M0 DX-COM-STICK-KIT (Bluetooth Stick)
Parameterization App	Not supported	Bluetooth Stick DX-COM-STICK3-KIT is required 

Connection cable, Keypad or Bluetooth Stick are not supplied with the RAMO5. Those are optional articles.

The drivesConnect mobile app helps to connect smartphone to the RAMO5. The parametrization and monitor information can be done by using the app (Android or IOS based). For detailed information refer to App Note: AP040189EN in [Drives AP Note Overview Document](#)

6 Sensor Inputs and general comparison

The new generation RAMO5 has the same functionality of the sensors and switches as RAMO 4.0. The illustration below shows the positions of the elements.



RAMO 4.0

RAMO5

The LED status signals are slightly different e.g. on AS-I connection. Refer to device manual for the detailed information.

7 Motor Plug and Motor Cable

RAMO 4.0 and RAMO5 have the same motor plug type HAN Q8. There is no need to order new cable.

8 DIP Switch Setting vs. Parameter Settings

The functionality of RAMO 4.0 and RAMO5 is the same. With RAMO 4.0 the functions are set using DIP switches. With RAMO5 this is done via parameters.

There are 3 different Switches on RAMO 4.0:

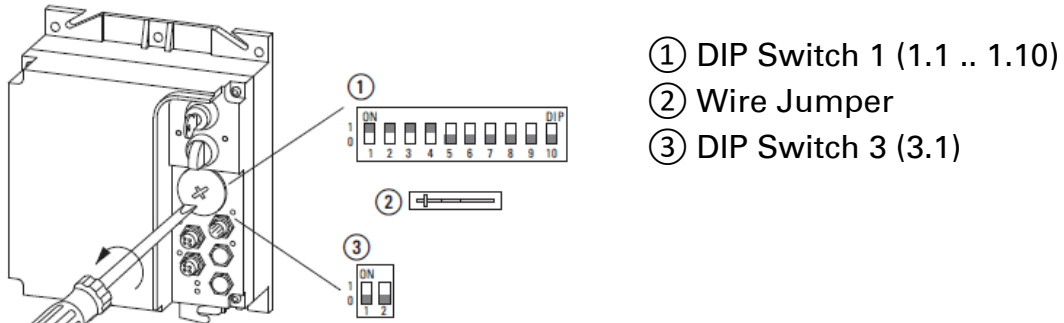




Figure 4: DIP Switch Setting

8.1 DIP Switch 1.1-1.4 vs P1-08 (Motor Nominal Current)


					DIP Switch 1.1 DIP Switch 1.2 DIP Switch 1.3 DIP Switch 1.4	
Display Number				Display Name		Definition
RASP 4.0				RASP5		
DIP 1.1	DIP 1.2	DIP 1.3	DIP 1.4	P1-08	Motor Nominal Current	Assigned motor rating at 400 V, 50 Hz
ON	ON	ON	ON	0	No function	-
ON	OFF	ON	ON	0.3	0.3 A	90 W
OFF	ON	ON	ON	0.4	0.4 A	120 W
ON	OFF	OFF	OFF	0.6	0.6 A	180 W
OFF	ON	OFF	OFF	0.8	0.8 A	250 W
ON	ON	OFF	OFF	1.0	1.0 A	370 W
OFF	OFF	ON	OFF	1.2	1.2 A	370 W
ON	OFF	ON	OFF	1.5	1.5 A	550 W
OFF	ON	ON	OFF	1.7	1.7 A	550 W
ON	ON	ON	OFF	1.9	1.9 A	750 W
OFF	OFF	OFF	ON	2.1	2.1 A	750 W
ON	OFF	OFF	ON	2.6	2.6 A	1.1 kW
OFF	ON	OFF	ON	3.6	3.6 A	1.5 kW
ON	ON	OFF	ON	5.0	5.0 A	2.2 kW
OFF	OFF	ON	ON	6.6	6.6 A	3.0 kW
OFF	OFF	OFF	OFF	-	-	-

8.2 DIP 1.5 vs P3-06...09 (Sensor Input Configuration)

DIP Switch 1.5			
			
Display Number		Display Name	Definition
RAMO 4.0	RAMO5		
DIP 1.5 OFF ON	P3-06 0 1	SEN I1 Logic	Sensor 1 Logic normally open normally closed
DIP 1.5 OFF ON	P3-07 0 1	SEN I2 Logic	Sensor 2 Logic normally open normally closed

Note: Each Sensor on RASP5 can be configured individually. DIP 1.5 on RAMO 4.0 changes all sensors to falling edge if set to ON.


8.3 DIP 1.6 and 1.8 vs P1-13 (Quick stop and interlocked manual operation)

DIP Switch 1.6 DIP Switch 1.8			
			
RAMO 4.0		RAMO5	Display Name
DIP1.6	DIP1.8	P1-13	SEN Config Select
OFF	OFF	1	Details see following table
ON	OFF	2	
OFF	ON	3	
ON	ON	4	


RAMO5-D... direct starter			
P1-13	Configuration Functions of I1 and I2	Restart conditions in manual mode	Restart conditions in automatic mode
1	No function (as supplied)	-	-
2	SEN I1 and SEN I2 stop the motor in Auto and Manual mode	Key switch reset on rising edge	Command change via AS-I
3	SEN I1 stops the motor in Auto mode	-	Command change via AS-I
4	SEN I1 stops the motor in Auto and Manual mode	Key-operated switch reset and SEN I1 no longer active on rising edge or level detection	Command change via AS-I

RAMO5-W... reversing starter			
P1-13	Configuration Functions of I1 and I2	Restart conditions in manual mode	Restart conditions in automatic mode
1	No function	-	-
2	SEN I1 stops the motor in both rotation directions in Auto mode	-	Command change via AS-I
3	SEN I1 stops the motor in the FWD direction in Auto mode	-	Command change via AS-I
	SEN I2 stops the motor in the REV direction in Auto mode		
4	SEN I1 stops the motor in the FWD direction in Auto and Manual mode	REV: Change direction of rotation to FWD for edge or level control	Command change via AS-I
		FWD: from REV and loss of SEN I1	
		FWD: Key switch reset and SEN I1 no longer active for edge control or level control	
	SEN I2 stops the motor in the REV direction in Auto and Manual mode	FWD: Change direction of rotation to REV for edge or level control	
		REV: from FWD and loss of SEN I2 for edge control or level control	
		REV: Key switch reset and SEN I2 no longer active for edge control or level control	


8.4 DIP 1.7 vs P6-08 (Change phase sequence motor)

DIP switches 1.7			
			
Display Number		Display Name	Definition
RAMO 4.0	RAMO5		
DIP 1.7	P6-08	Change phase sequence motor	Output phase sequence: U V W U W V
OFF	0		
ON	1		

8.5 DIP 1.9 vs P6-05 (Monitoring the current lower limit)


DIP switches 1.9			
			
Display Number		Display Name	Definition
RAMO 4.0	RAMO5		
DIP 1.9	P6-05	Monitoring the current lower limit	Function 1 = ON: Reaction to motor underload activated 0 = OFF: Reaction to motor underload deactivated
ON: Reaction to motor underload activated			
OFF: Reaction to motor underload deactivated			

8.6 DIP 1.10 vs P6-05 (AS-interface diagnostics)

DIP switches 1.10			
			
Display Number		Display Name	Definition
RAMO 4.0	RAMO5		
DIP 1.10	-	No corresponding parameter	RAMO5: Diagnostic status through AS-interface parameter is always active.
OFF			
ON			

8.7 Wire Jumper vs P2-27 (Thermistor fault response)


Wire Jumper

			
Display Number		Display Name	Definition
RAMO 4.0	RAMO5		
Wire Jumper Open Position: Reaction to Thermistor fault is deactivated Closed Position: Reaction to Thermistor fault is activated	P2-27	Thermistor fault response	P2-27 = 0: Reaction to Thermistor fault is deactivated P2-27 = 1: Reaction to Thermistor fault is activated

The setting of parameter P2-27 may only be changed by trained specialist personnel!

8.8 DIP Switch 3.1 vs P5-10 (quick stop suppression)

The quick-stop function is performed via DQ3 (ASi signal).

 DIP Switch 3.1 (left) DIP Switch 3.2 (right) is without function			
Display Number		Display Name	Definition
RAMO 4.0	RAMO5		
DIP 3.1 (left) OFF ON	P5-10 0 1	Disable QuickStop	AS-I Bit DQ3 enable – quick stop suppression 0: Quick stop via sensors deactivated 1: Quick stop via sensors activated

RAMO 4.0

AS-I Output Bit 3 is active if DIP 3.1 (left) is set to ON.

DIP 3.1	DQ3	Function	Description
ON	0	Quick stop ON	Response to sensors
ON	1	Quick stop OFF	No response to sensors
OFF	0	none	DQ3 signals will not be transmitted
OFF	1	none	DQ3 signals will not be transmitted

DIP 3.1	DQ3	Function	Description
ON	0	Quick stop ON	Response to sensors
ON	1	Quick stop OFF	No response to sensors
OFF	0	none	DQ3 signals will not be transmitted
OFF	1	none	DQ3 signals will not be transmitted

RAMO5

The function can be activated via parameter P5-10.

Parameter	Designation	Description	Unit
P5-10	QuickStop lock	0: Quick stop via sensors deactivated. 1: Quick stop via sensors activated (ASi signal active).	—

P5-10	DQ3	Function	Description
1	0	Quick stop ON	Response to sensors
1	1	Quick stop OFF	No response to sensors
0	0	None	DQ3 signals will not be transmitted
0	1	None	DQ3 signals will not be transmitted

9 Parameters RAMO5

Quick Setup Parameters		
Display Number	Name	Definition
P1-08	Motor Nom Current	Motor Rated Current
P1-13	DI Config Select	Input / Speed Configuration Table
P1-14	Access Key	Extended Menu Access Code P1-14 = 0 (default) All parameters are saved, independent from the setting of P1-14 Note: Set P1-14 to 101 (default) to display the extended parameter menu. A change of P2-32 affects P1-14. Do not change P2-32 if it is not necessary.

Advanced Parameters		
Display Number	Name	Definition
P2-24	Start Mode	Start/restart mode selection 0: Edge-r, 1 = Auto-0 2..10: Auto-1 to Auto-9
P2-26	Auto Reset Delay	Wait time before an automatic restart
P2-27	Action@Thermistorfault Motor	Motor Thermistor Configuration 0: Disabled 1: Enabled (Trip level defined by hardware)
P2-28	Service Interval Time	Maintenance Time Interval
P2-29	Reset ServiceIndicator	Reset Maintenance timer 0: No function 1: Reset
P2-30	Parameter Set	Restore Default parameter values to drive 0: No function 1: Default

P2-32	Access Key Level2	Password setting
P2-33	Parameter Lock	Parameter access lock
P2-34	TCP Enable Service	Enable communications interfaces (P2-34 is a bitmap parameter)
P2-36	Save Parameters @24V-ext.	Save parameters @ external 24V mode 0: Disable 1: Enable

Digital Sensors & Input/Output Function		
Display	Name	Definition
P3-04	Brake Release Delay	External brake open delay time
P3-05	Brake Apply Delay	External brake close delay time
P3-06	SEN I1 Logic	Sensor I1 - normally open/normally closed
P3-07	SEN I2 Logic	Sensor I2 -normally open/normally closed

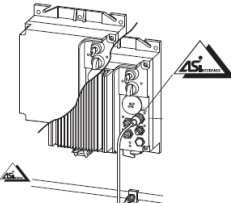
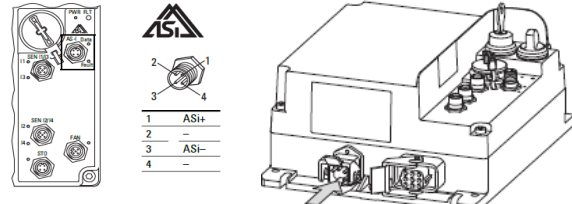
Communications		
Display	Name	Definition
P5-01	RS485-0 Address	Drive Fieldbus Address
P5-02	COM Loss Timeout	Communications Loss Timeout
P5-03	Action@Communication Loss	Communications Loss Action 0: Trip 1: Trip (Reserved) 2: Stop
P5-05	NETSendPZD3	Configuration of the 3rd process data word PDO-3
P5-06	NETSendPZD4	Configuration of the 4th process data word PDO-4
P5-10	Disable QuickStop	AS-I Bit DQ3 enable – quick stop suppression 0: Quick stop via sensors deactivated 1: Quick stop via sensors activated

Advanced Motor Control		
Display	Name	Definition
P6-05	Action@Underload Motor	Underload protection 0: deactivated 1: Trip (stop)
P6-08 RAMO5-W... only!	Change Phase sequence Motor	Output phase sequence 0: U V W 1: W V U

10 Requirements for Parametrization and PLC Communication

The following tables show the differences in the power supply for PLC communication and the parameterization via PC.

10.1 PLC Communication

PLC Communication	
RAMO 4.0	RAMO5
AS-I Supply is required	AS-I Supply or Power Supply (mains) required
	

10.2 Parametrization

Parametrization	
RAMO 4.0	RAMO5
DIP Switches – Power supply not necessary. Settings will be active after power supply (mains) = ON.	AS-I Supply or Power Supply (mains) required RAMO5 parameter save via P2-36 is required when the unit is operating on AS-I supply only .

Note: If RAMO5 supplied with AS-I connection only, the parameter settings must be saved with P2-36!

11 Power Consumption from AS-I power supply

Total power consumption from AS-Interface power supply (30 V DC) of RAMO5 and RAMO 4.0 is listed below:

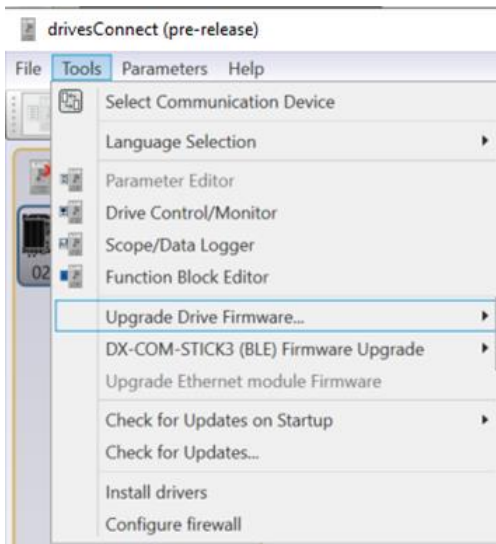
RAMO 4.0: 30 mA + max. 160 mA for sensors

RAMO5: 50 mA + max. 160 mA for sensors

12 Firmware Update

The firmware of RAMO5 can be updated by using drivesConnect software and serial cable DX-CBL-PC-3M0.

Warning: Copy Stick DX-COM-STICK3 is not allowed to use for update!



13 References

Documentation			
	RAMO 4.0	RAMO5	LINK
Manual RAMO...	MN034004EN	MN034004EN	DownloadCenter
Instruction Leaflet RAMO...	IL034084ZU	IL034084ZU	DownloadCenter
Application Note - Parametrisation per Bluetooth	-	AP040189EN	Drives AP Note Overview Document http://www.eaton.com/ap/overview/drives
PowerXL Device Firmware Update	-	AP040214EN	Drives AP Note Overview Document http://www.eaton.com/ap/overview/drives

Eaton is dedicated to ensuring that reliable, efficient and safe power supply is available when it is needed most. With vast of energy management across different industries, experts at Eaton deliver customized, integrated solutions to solve our customer' most critical challenges.

Our focus is on delivering the right solution for the Application. But decision makers demand more than just Innovative products. They turn to Eaton for an unwavering Commitment to personal support that makes customer Success a top priority. For more information, visit Eaton.com

Eaton addresses worldwide:

Eaton.com/us/en-us/locate/global-locations.html

Eaton Industries GmbH
Hein-Moeller-Str. 7- 11
D-53115 Bonn/Germany

® 2020 Eaton
All Rights Reserved
Publication No. AP040198EN

Eaton is a registered trademark
All other trademarks are property
of their respective owners