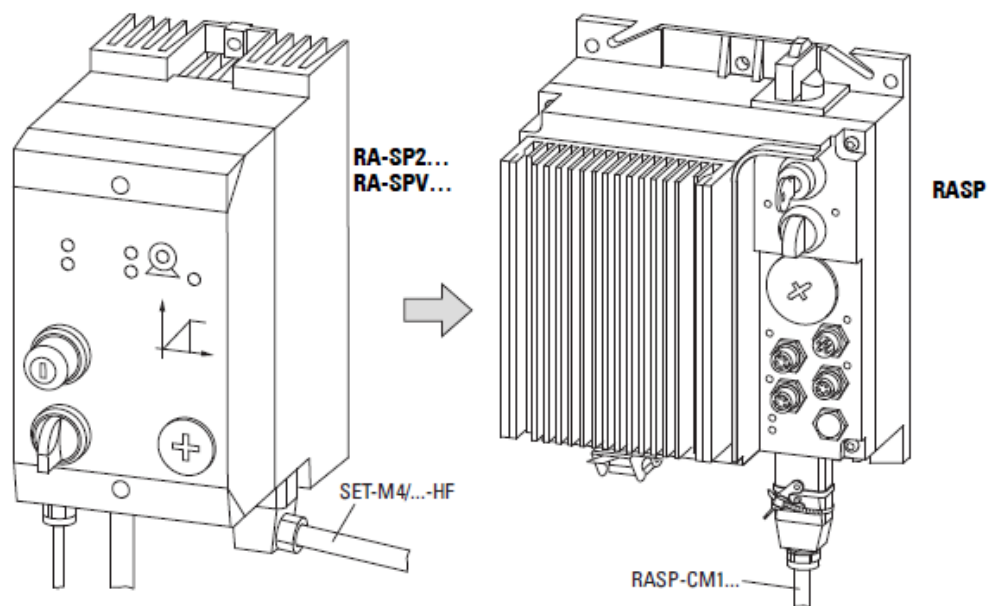


Rapid Link

RASP

Generation Change RA-SP to RASP 4.0



Level 3	<ul style="list-style-type: none"> 1 – Fundamental – No previous experience necessary 2 – Basic – Basic knowledge recommended 3 – Advanced – Reasonable knowledge required 4 – Expert – Good experience recommended
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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.

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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.).
- Frequency inverters may have hot surfaces during and immediately after operation.
- Removal of the required covers, improper installation or incorrect operation of motor or frequency inverter 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 frequency inverters.
- 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 frequency inverters must be provided with additional monitoring and protective devices in accordance with the applicable safety regulations. Modifications to the frequency inverters 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 frequency inverter (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 frequency inverter 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

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1 General

The following information indicates the differences that must be taken into account when expanding systems or creating new projects with RASP (Rapid Link 4.0) units, as well as when using them to replace RA-SP2... and/or RA-SPV... devices..

The devices have the following major differences:

- Dimensions
- AS-Interface profile
- Parameter software and technical overview
- Type and design of motor cables.

The controls' handling and functions remain the same. RASP combines the functionality of RA-SP2... and RA-SPV... in a single device. If required, the vector functionality can be activated via the parameters.

2 Dimensions

Figure below shows the dimension of new RASP devices:

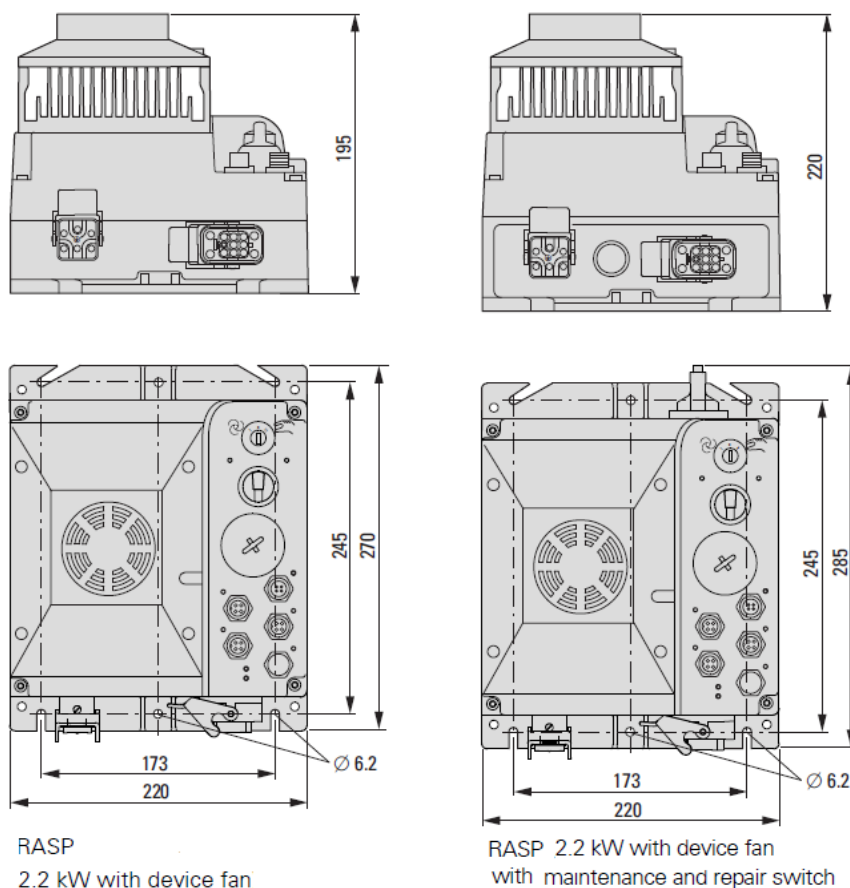


Figure 1: Dimensions of RASP 4.0 with fan

RASP speed controllers

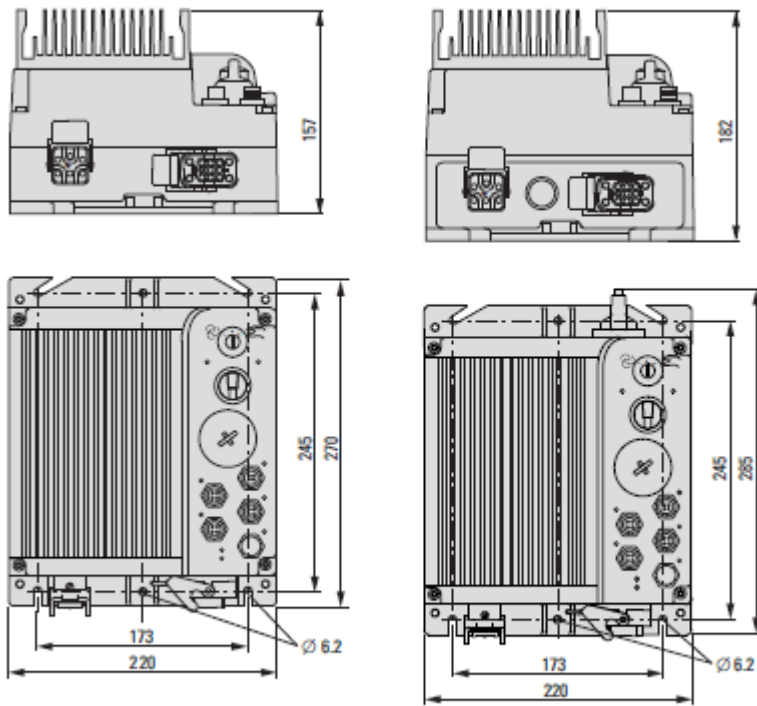


Figure 125: RASP-2, RASP-3, RASP-4

Figure 126: RASP-2, RASP-3, RASP-4 with repair and maintenance switch

Figure 2: Dimensions of RASP 4.0

3 AS-I Profile

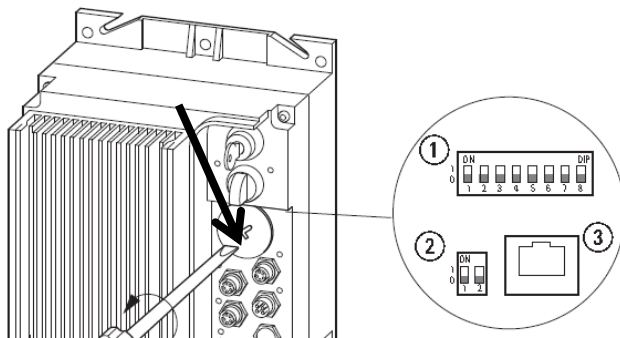
RASP... units have AS-i profile S-7.E.0 (old) and AS-i profile S-7.4 (new). Due to the expanded AS-i profile, the master (gateway) needs to carry out a new initialization process if new RASP devices with profile S-7.4 are used as a replacement. To do this, the AS-i master needs to be switched to configuration mode. In this mode, the AS-i master will recognize the type and profile of the AS-i slaves connected to the AS-i cable. The profile is hardcoded into the slave modules during production and cannot be changed. On e.g. PROFIBUS/AS-i gateways, this configuration mode can usually only be activated if there are no ongoing communications with the PROFIBUS. The assignment of Rapid Link inputs/outputs and the data bits remain the same. The PLC programs do not have to be modified.

4 Replacement Sequence

Proceed following steps for a proper replacement.

1. Read the parameter from RA-SP... (with DrivesSoft).
2. Read the address from RA-SP... (with Addressing device).
3. Note the DIP-Positions of the RA-SP...
4. Disconnect Motor-, Energy-, Asi-, Sensor-, Actor connectors from RA-SP...
5. Switch Key to HAND Mode (RASP...)

6. Set Parameters of the RASP accordingly (with RASP-KEY-S1 or MaxConnect)
7. Give the address of RA-SP to the RASP...
8. Set the DIP switches of RASP... accordingly.



9. Connect all cables, Line 400 V AC, AS-Interface, Motor and Sensors und Actor.
10. Ready to start.



Notice!

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

5 Communication cable between PC and RASP

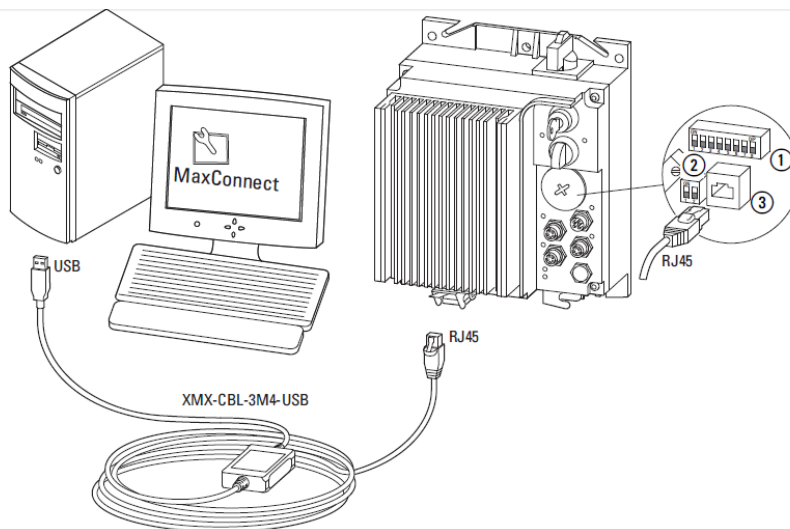


Figure 3: Communication cable XMx-CBL-3M4-USB

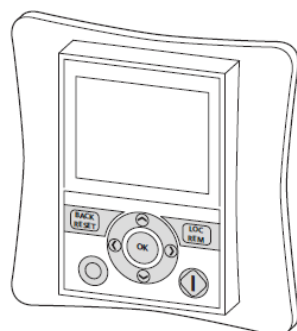
RASP plug for cable screw gland

- ① Functions, dip switch
- ② dip switch (currently without function)
- ③ Serial interface (RJ 45)

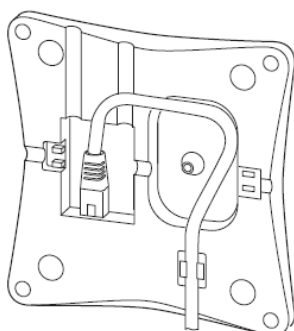
Connection cable XMx-CBL-3M4-USB allows communication and data exchange between RASP and a PC. The cable has a length of about 3.4 m, an interface converter with electrical isolation, an RJ45 plug and a USB port. Connection cable XMx-CBL-3M4-USB is not supplied with the RASP.

6 Optional keypad RASP-KEY-S1

The optional RASP-KEY-S1 keypad enables you to configure the RASP's parameters and view operational data. The Start and Stop keys and the setpoint input have no function. The connection to the RASP requires a patch cable with an RJ45 plug. The optional RASP-KEY-S1 LCD keypad is not included with RASP units. The equipment supplied with the RASP-KEY-S1 LCD keypad includes a 1-m long patch cable.



RASP-KEY-S1
(article no.: 156644)




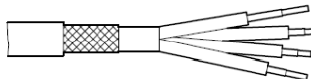
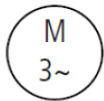
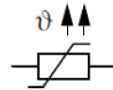
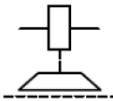
RJ45 socket at the back of LCD
keypad RASP-KEY-S1

Figure 4: Keypad for RASP

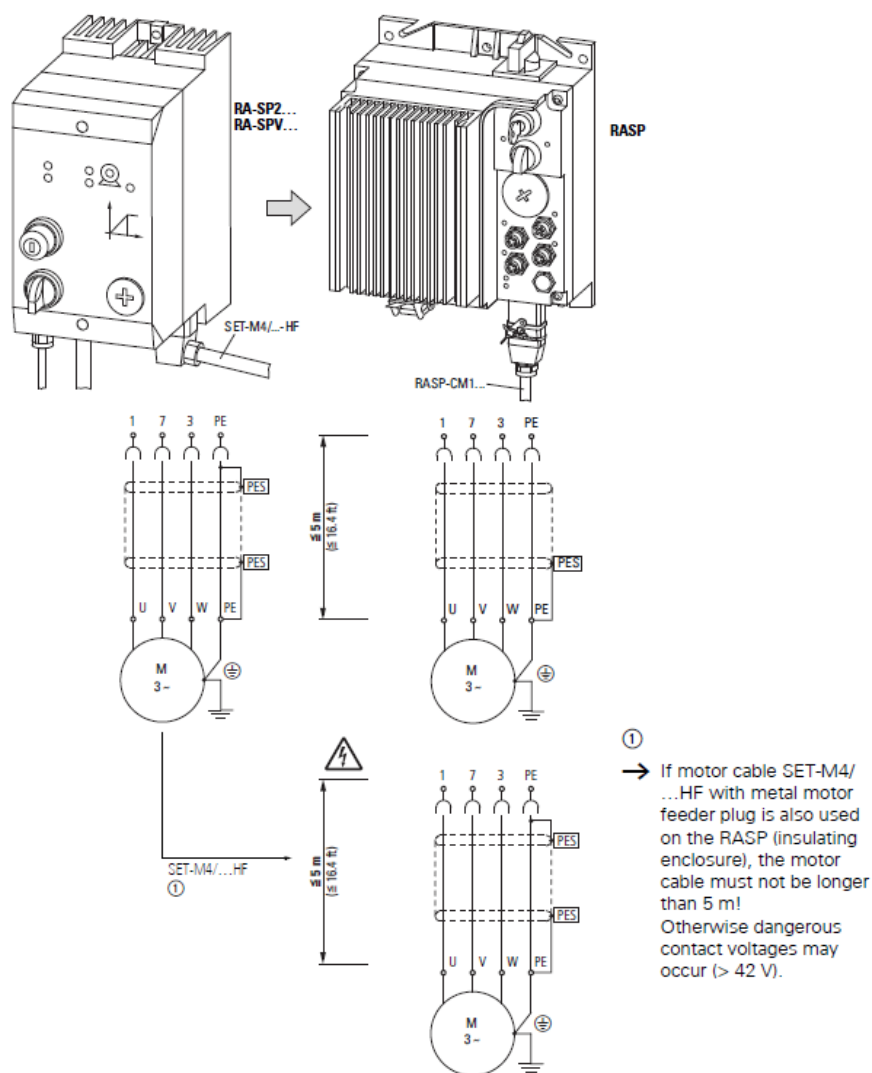
7 RASP Motor cable (RASP-CM1-...)

The motor must be connected using unshielded, DESINA-compliant, motor cable

RASP-CM1-.. (4 x 1,5mm² + 2 x (2 x 0.75) mm²) with the following PIN assignment: 0

				
1	1	U1		
Coding	-			
3	3	W1		
4	5			B1
5	7		T1	
6	6			B2
7	2	V1		
8	8		T2	
PE	PE*	PE		

*PE = green-yellow



8 Parameter Cross Reference (DrivesSoft vs. MaxConnect)

MaxConnect							DrivesSoft	
PNU	ID	Zugriffsrecht		Bezeichnung	Wertebereich	WE (P1.1 = 1)	PNU RA-SP	Bemerkung RA-SP
		RUN	ro/rw					
Parameter range								
P1.1	115	✓	rw	Parameter ranges		1	not available	
					0 = Expert (extended parameter set) 1 = Base Standard parameters			

P1.2	540	-	rw	Applications		0		
					1 = FWD/FF1/FF2/FF3 2 = PM-Motor (not activated)			
P1.3	1472	-	rw	Default setting, country-specific	0 = EU 1 = USA	0		
Drive control								
P6.1	125	✓	rw	Control Source	1 = I/O (Control terminal) Asi output DQ0-DQ3 2 = KEYPAD (external control unit)	1	A02 1 2	
P6.2	117	✓	rw	Set point setting		3	A01	
					0 = FF0 (Fixed frequency)			
					1 = REF (Control unit)		2	
					3 = Potentiometer n0 (AI1, control terminal 2)		1	
P6.3	101	-	rw	Minimum frequency	0,00 - P6.4 Hz	0,00	A11/A62	
P6.4	102	-	rw	Maximum frequency	P6.3 - 320,00 Hz	50,00	A04/A61 /A12	
P6.5	103	-	rw	Acceleration time (acc1)	0,1 - 3000,0 s	5,0	F02	
P6.6	104	-	rw	Deceleration time (dec1)	0,1 - 3000,0 s	2,0	F03	
P6.7	505	-	rw	Start function		0		
					0 = Acceleration time (ramp)			

					1 = Flying restart circuit		b01	working right after the motor switched-off only
P6.8	506	-	rw	Stop function		1	b91	
					0 = Free coasting		1	
					1 = Deceleration time (ramp)		0	
P6.9	500	-	rw	S ramp time-based waveform	0,00 = linear 0,1 - 10,0 s = S-shaped	0,0	A97 (accel) A98 (decel)	Using F02 for ramp time Using F03 for ramp time
P6.19	502	✓	rw	Acceleration time (acc2)	0,1 - 3000,0 s	10,0	A92	Set A94 for switching via digital input or A95 / A96
P6.20	503	✓	rw	Deceleration time (dec2)	0,1 - 3000,0 s	10,0	A93	
P6.21	526	-	rw	Transition frequency (acc1 - acc2)	0,00 = deaktiviert 0,01 - P6.4 Hz	0,00	A95	
P6.22	1334	-	rw	Transition frequency (dec1 - dec2)	0,00 = deaktiviert 0,01 - P6.4 Hz	0,00	A96	
Motor								
P7.1	113	-	rw	Motor, rated operational current	0.2x I _e - 2 x I _e (→ Motor rating plate)	I _e	b12	
P7.2	107	-	rw	current limitation	0,2x I _e ... 2 x I _e	1,5 x I _e	b22	with b23 the time constant could be used for current limit
P7.3	112	-	rw	Motor, rated speed	300 ... 20000 min ⁻¹ (â Motor rating plate)	1440	not available	Indirectly via H04 (Motorpole)
P7.4	120	-	rw	Motor, power factor (cos φ)	0,3 - 1,00 (â Motor rating plate)	0,85	not available	Use H03 motor power
P7.5	110	-	rw	Motor, rated	180 - 500 V (â Motor rating plate)	400	A82	

				operating voltage				
P7.6	111	-	rw	Motor, rated frequency	30 - 320 Hz (â Motor rating plate)	50,00	A03	

Protective functions								
P8.3	703	-	rw	Earth fault monitoring		2	not available	
					0 = Deactivated			
					1 = Warning			
					2 = Error, stop according to P6.8			
P8.4	709	-	rw	Stall protection		2	not available	
					0 = Deactivated			
					1 = Danger			
					2 = Error, stop according to P6.8			
Fixed frequencies								
P10.1	124	✓	rw	Fixed frequency FF0	0,00 - P6.4 Hz	5,00	A21	
P10.2	105	✓	rw	Fixed frequency FF1	0,00 - P6.4 Hz	30,00	A22	
P10.3	106	✓	rw	Fixed frequency FF2	0,00 - P6.4 Hz	40,00	A23	
P10.4	126	✓	rw	Fixed frequency FF3	0,00 - P6.4 Hz	50,00	A24	
P10.5	127	✓	rw	Fixed frequency FF4	0,00 - P6.4 Hz	10,00	A25	
P10.6	128	✓	rw	Fixed frequency FF5	0,00 - P6.4 Hz	15,00	A26	
P10.7	129	✓	rw	Fixed frequency FF6	0,00 - P6.4 Hz	20,00	A27	
P10.8	130	✓	rw	Fixed frequency FF7	0,00 - P6.4 Hz	25,00	A28	
V/f characteristic curve								

P11.1	108	-	rw	V/f- characteristic curve Characteristic		0	A44	
					0 = linear		0	
					1 = squared		1	
					2 = parameterizable		2	Sensorless vector
P11.2	602	-	rw	Cut-off frequency	30,00 - 320,00 Hz	50,00	A03	
P11.3	603	-	rw	Output voltage	10.00 - 200.00 % of nominal motor voltage (P6.5)	100,00	A45	
P11.4	604	-	rw	V/f- characteristic curve Mean frequency value	0,00 - P11.2 Hz	50,00	not available	
P11.5	605	-	rw	V/f- characteristic curve Mean voltage value	0,00 - P11.3 Hz	100,00	not available	
P11.6	606	-	rw	Output voltage at zero frequency	0,00 - 40,00 %	0,00	A42/A43	
P11.7	109	-	rw	Torque increase		0	A41	
					0 = Deactivated 1 = active		0 1	Manual Boost Automatic Boost
P11.8	600	-	rw	Control Mode		0	A44	
					0 = Frequency control (V/f)		0/1	
					1 = Speed control (vector)		2	
P11.9	601	-	rw	Pulse frequency	1,5 - 16,0 kHz	6,0	b83	
P11.10	522	-	rw	Pulse frequency, stabilizer (sinusoidal filter)		0	not available	
					0 = Deactivated 1 = active			
Brake								
P12.5	504	-	rw	Brake chopper	Parameter display only RASP with	2	b90	0...100% duty within a 100s interval

					braking resistance			
					0 = Deactivated			
					1 = Active in RUN			
					2 = Active in RUN and STOP			
P12.6	1447	-	rw	Brake chopper Switching threshold	Parameter display only RASP with braking resistance 0 - 911 V	765	not available	
P12.7	1448	-	rw	Open external brake, deceleration time	0,00 - 320 s	0,20	not available	
P12.8	1449	-	rw	Open external brake, frequency limit value	0,00 - 320,00 Hz	1,50	C42	
P12.9	1450	-	rw	Close external brake, frequency limit value	0,00 - 320,00 Hz	1,00	C43	
P12.10	1451	-	rw	Close external brake, frequency limit value on reversing (REV)	0,00 - 320,00 Hz	1,50	not available	
P12.11	1452	-	rw	Open external brake, current limit value	0,00 - P7.2 A	0,00	not available	

System parameter								
Hard- and Software information								
S1.1	833	-	ro	API SW ID	-	0	not available	
S1.2	834	-	ro	API SW Version	-	0	not available	
S1.3	835	-	ro	Power SW ID	-	0	not available	
S1.4	836	-	ro	Power SW Version	-	0	not available	
S1.5	837	-	ro	Application ID	-	0	not available	

S1.6	838	-	ro	Application revision	-	0	not available	
S1.7	839	-	ro	System load	%	0	not available	
Counter								
S3.1	827	-	ro	MWh counter	MWh	0,000	not available	
S3.2	828	-	ro	Operation days	d	0	not available	
S3.3	829	-	ro	Operating hours	H	0	not available	
S3.4	840	-	ro	RUN counter, days	d	0	not available	
S3.5	841	-	ro	RUN counter, hours	H	0	not available	
S3.6	842	-	ro	FLT counter		0	not available	
User settings								
S4.1	830	✓	rw	Kontrast der Anzeige (externes Keypad)	0 - 15	7	not available	
S4.2	831	-	rw	Werkseinstellung (WE)		0	b84	For factory setting, press the buttons in a certain configuration
					0 = current values		b85 (country settings)	
					1 = deletes all values and restores the factory default settings			
S4.3	832	✓	rw	Passwort	0000 = deaktiviert	0000	not available	via digital input C01...C05/C06
					0001 - 9999 = Passwort			

Display values								
M1.1	1	-	ro	Output frequency	Hz	0,00	d01	
M1.2	25	-	ro	Frequency reference value	Hz	0,00	F01	
M1.3	2	-	ro	Motor shaft speed	rpm (calculated value , min ⁻¹)	0	d07	
M1.4	3	-	ro	Motor current	A	0,00	d02	
M1.5	4	-	ro	Motor torque	% (calculated value)	0,0	not available	

M1.6	5	-	ro	Motor Power	% (calculated value)	0,0	not available	
M1.7	6	-	ro	Motor voltage	V	0,0	not available	
M1.8	7	-	ro	DC link voltage	V	0	not available	
M1.9	8	-	ro	Unit temperature	°C	0	not available	
M1.10	9	-	ro	Motor temperature	°C (calculated value)	0	not available	
M1.11	13	-	ro	Analog input A1	% (Potentiometer n ₀)	0,0	not available	
M1.14	15	-	ro	Digital input DI1, DI2, DI3 (ASi outout DQ0-DQ1)	DI1 = 100, DI2 = 10, DI3 = 1 (0-1-10-11-100-101-110-111)	0	d05	
M1.15	16	-	ro	Digital Input DI4, DI5, DI6 (ASi Output DQ2-DQ3)	DI4 = 100, DI5 = 10, DI6 = 1 (0-1-10-11-100-101-110-111)	0	d05	
M1.16	17	-	ro	Digital Output RO1, RO2, DO (ASi Input DI0-DI1)	RO1 = 100, RO2 = 10, DO = 1 (0-1-10-11-100-101-110-111)	0	d06	
M1.21	1480	-	ro	Counter, digital output	n	0		

9 References

RA-SP-		RASP-...	LINK
Communication			
DEX-KEY-10 (Keypad)		RASP-KEY-S1 (Keypad)	
DriveSoft (Parametersoftware)		MaxConnect ab V 1.1.2.0 (Parametersoftware)	
DEX-CBL-2M0-USB (PC Cable)		MMX-CBL-3M4-USB (PC Cable)	
Documentation			
AWA2190-1936		IL0306020Z	DownloadCenter
AWB2190-1430E		MN03406003Z-EN	DownloadCenter



Notice!

Follow the engineering instructions (AWA/AWB or IL/MN) for the device concerned.

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