

USER MANUAL

KEA 350 P2 / KEA 350 RP-P2





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1 Amendments

Created	Amendments	Name
2019-10-16	Creation	Twesten
2020-05-25	Layout adjustment	Twesten
2020-09-17	Implementation of QR Code	Twesten



2 Brief Overview



Fig. 1:

KEA 350 RP-P2 Series



Fig. 2:

- 1 Terminal 21-40: Mains/Generator/Busbar voltage
- 2 Terminal 1-20: Mains/GND current, Generator current, Analog inputs/outputs
- 3 Terminal 101-120: Analog Input 10, Analog Out- puts 3-6, Busbar Voltage L3/N
- 4 Terminal 81-100: Transistor Output SO1, Analog Inputs 4-9
- 5 RS-485 interface RS-485 #1
- 6 CAN bus interface CAN #2
- 7 CAN bus interface CAN #3
- 8 CAN bus interface CAN #1

KEA 350 P2 Series

- 9 Terminal 141-160: Discrete Outputs 13-23, Transistor Output SO2
- 10 Terminal 61-80: Discrete inputs, MPU, power supply, and D+
- 11 Terminal 121-140: Relay outputs 13-22
- 12 Terminal 41-60: Relay outputs 01-12
- 13 USB interface (2.0, slave) SERVICE port
- 14 ETHERNET interface (RJ-45) LAN C
- 15 ETHERNET interface (RJ-45) LAN B
- 16 ETHERNET interface (RJ-45) LAN A



The KEA 3X0 series are control units for engine-generator system management applications. The control units can be used in applications such as: co-generation, stand-by, AMF, peak shaving, import/export or distributed generation.

The KEA 3X0 series is also applicable for islanded, island parallel, mains parallel and multiple unit mains parallel operations.

Scope of delivery

The following parts are included in the scope of delivery. Please check prior to the installation that all parts are present.





- A/B KEA 350 RP-P2(sheet metal housing) or KEA 350
 P2 (-LT) genset control (plastic housing).
 All screwable terminal connectors are delivered with plug and jack.
- C QR Code (Link to configuration software and manual)

C and D with plastic housing KEA 350 P2 (-LT) only:

- D Clamp fastener installation material 4 x
- E Screw kit installation material 12 x
- F Printed QR Code sticker 2 x)



E

Configuration files and Technical Manual are available at the CD-ROM and additionally on device internal memory. Opening USB connection to the KEA 3X0 offers read access to the files listed below but with status "delivery" please be aware that this files are not updated. Please contact Kuhse for the latest versions.



Files stored at KEA 3X0 device:

- Configuration
 - msi-file (installing application files and ToolKit)
 - eds-file (zipped)
- Documentation
 - Technical Manual (PDF)



2.1 Terminal Allocation



Fig. 4: Terminals KEA 350-P2(-LT) plastic housing



Fig. 5: Terminals KEA 350-P2 sheet metal housing

2.2 Wiring Diagram



The Protective Earth terminal 61 is not connected on the sheet metal housing.

 Use the protective earth (PE) connector located at the bottom center of the sheet metal housing instead.



Image: state of the				USE Hos In preparati	} t on	USB Device				Ethernet C	Ether B	net	Ethe A	rnet A		Screw	terminals	
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1 1 000000000000000000000000000000000000	3 4		[802]	Relay [R02] *1			-									0.Vac		
Image: stand	4		[R02]	Preconfigured to Relay [R03] *1	Central	ized alarm	-		В	usbar voltage			L1		00	0 vac	m	
i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i	15 4		[R04]	Preconfigured to Relay [R04] *1	Starter				-						60	0 Vac	36	
1 1 1 1 000 Viz 1 1 1 1 000 Viz 1 000 Viz 1 1 1 1 000 Viz 1 000 Viz 1 1 1 1 000 Viz 1 000 Viz 1 1 1 1 000 Viz 1 000 Viz 1 1 1 1 1 000 Viz 1 1 1 1 1 1 1 000 Viz 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	46 4		[[[04]]	Preconfigured to	Fuel so	lenoid / gas va	alve		G	enerator volta	ige N						-	
i Rosy (PB) locked Rosy (PB) locked <t< td=""><td>47</td><td></td><td></td><td></td><td>•1</td><td></td><td></td><td></td><td>┢</td><td></td><td></td><td>_</td><td></td><td></td><td>60</td><td>0 Vac</td><td>34</td></t<>	47				•1				┢			_			60	0 Vac	34	
Redu Redu <th< td=""><td>48</td><td></td><td>[R05]</td><td>Relay [R05] isola Preconfigured to</td><td>ated Preglov</td><td>v</td><td></td><td>80</td><td>G</td><td>enerator volta</td><td>ige L3</td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	48		[R05]	Relay [R05] isola Preconfigured to	ated Preglov	v		80	G	enerator volta	ige L3							
8 [R06] Finded 5, Command Coles GCP; IF GCB 0 Command Coles GCP; IF GCB Command Coles GCP; IF GCB 1 Finded 5, Command Coles GCP; IF GCB Command Coles GCP; IF GCB 1 Finded 5, Command Coles GCP; IF GCB Command Coles GCP; IF GCB 1 Finded 5, Command Coles GCP; IF GCB Command Coles GCP; IF GCB 1 Finded 5, Command Coles GCP; IF GCB Mains voltage L3 Col Vac 7 1 Finded 5, Command Coles GCP; IF GCB Mains voltage L3 Col Vac 7 1 Finded 5, Command Coles GCP; IF GCB Mains voltage L3 Col Vac 7 1 Finded 5, Command Coles GCP; IF GCB Mains voltage L3 Col Vac 7 1 Finded 5, Command Coles GCP; IF GCB Mains voltage L3 Col Vac 7 1 Finded 5, Command Coles GCP; IF GCB Mains voltage L3 Col Vac 7 1 Finded 5, Command Coles GCP; IF GCB Mains voltage L3 Col Vac 7 1 Finded 5, Command Coles GCP; IF GCB Mains voltage L3 Col Vac 7 1 Finded 5, Command Coles GCP; IF GCB Mains voltage L3 Col Vac 7 1	49		,	Relav (R06) isola	ated *1		\neg	- -	┢			_			60	0 Vac	32	
π Files Fi	50		[R06]	Fixed to "Comma control is enabled	nd Clos	e GCB", if GC	в	ò	G	enerator volta	ige L2							
	51		,	Relay (R07) iso	lated	1		S				_			60	0 Vac	30	
π Herry (R08) Petry (R08) Isolated ⁻¹ π π file	52		[R07]	Fixed to "Comm open control is e	and Op enabled	en GCB", if G I.	СВ	a	G	enerator volta	ige L1							
π [R08] Pisef isCommand Close MCB', if MCB n neary [R09] noised: 600 Vac π 8 [R09] Neary [R09] Noise NoBB', if MCB Mains voltage N 600 Vac π 8 [R10] Reary [R09] No 600 Vac π 600 Vac π 8 [R11] Piset b,Command Close GBL', if GGB Mains voltage L3 600 Vac π 8 [R12] Piset b,Command Close GBL', if GGB Mains voltage L1 600 Vac π 9 [R12] Piset b,Command Close GBL', if GGB Mains voltage L1 600 Vac π 9	53			Relav (R08) isola	ated *1			□.							60	0 Vac	58	
Retsylft@ij Retsylft@ij Retsylft@ij Retsylft@ij R Retsylft@ij Retsylft@ij Retsylft@ij 600 Vac R R Retsylft@ij Retsylft@ij Retsylft@ij Retsylft@ij Retsylft@ij R R Retsylft@ij Retsylft@ij Retsylft@ij R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R	54		[R08]	Fixed to "Comma control is enabled	nd Clos	se MCB", if MC	в	В	M	lains voltage N	1							
N Find B, Command Gen MGB, 'f MCB N Find B, Command Gen MGB, 'f MCB N Resy (Rt) ¹ Resy (Rt) ¹ Resy (Rt) ¹ N Early (Rt) ¹ Resy (Rt) ¹ Resy (Rt) ¹ Place (Rt) ¹ Resy (Rt) ¹ Resy (Rt) ¹ Resy (Rt) ¹ Place (Rt) ¹ Resy (Rt) ¹ Resy (Rt) ¹ Resy (Rt) ¹ Place (Rt) Resy (Rt) ¹	55		1	Relay [R09] isola	ated ^{*1}			0				_			60	0 Vac	26	
Refer (F10) Refer (F10) 600 Vac ⊼ S Control is enabled. 600 Vac ⊼ S Refer (F11) Fixed to, Command Open GGB, 'I GGB 600 Vac ⊼ S IR12) Fixed to, Command Open GGB, 'I GGB 600 Vac ⊼ S IR12) Fixed to, Command Open GGB, 'I GGB 600 Vac ⊼ S IR12) Fixed to, Command Open GGB, 'I GGB 600 Vac ⊼ S IR12) Earth Fixed to, Command Open GGB, 'I GGB 600 Vac ⊼ S NC Isolated, 8 to 40 Vdc '2 Analog output [AO 02] - ⊼ S Auxiliary excitation D+ isolated Fixed to 2000 Nm / (AI 001) - □ S Common (terminals 67 to 78) Discrete Input [D03] cokted '1 Common (terminals 67 to 78) B ID001 Discrete Input [D03] cokted '1 Common (terminals 67 to 78) Common (terminals 67 to 78) Common (terminals 67 to 78) IAnalog Input Type 1 IAnalog Input Type 1 IAnalog Input Type 1 IAnalog Input Type 1 IAnalog Input Type	56		[R09]	Fixed to "Comma control is enabled	nd Ope I.	n MCB", if MC	B	F	M	lains voltage L	3							
Balance Balance <t< td=""><td>57</td><td></td><td>[R10]</td><td>Relay [R10] Fixed to "Comma</td><td>nd Clos</td><td>e GGB", if GG</td><td>в</td><td>I</td><td></td><td></td><td></td><td>_</td><td></td><td></td><td>60</td><td>0 Vac</td><td>24</td></t<>	57		[R10]	Relay [R10] Fixed to "Comma	nd Clos	e GGB", if GG	в	I				_			60	0 Vac	24	
R111 Field 5. Command Open GBR.*If GBB R111 Relay (R12) Relay (R12) Relay (R1	58			Relay [R11] *1				N N	M	lains voltage L	2							
S [112] Relay [R12] ¹ Preconfigured to Aiarm adass C. D. E or F S Earth S NC S Analog output (A0 02) + Analog output (A0 01) (A0 01) + S Auxiliary excitation D+ Isolated Commo (terminate 67 to 78) Commo (terminate 67 to 78) Discrete Input [00] isolated ¹ S Commo (terminate 67 to 78) S Commo (terminate 67 to 78) S Commo (terminate 67 to 78) B Commo (terminate 67 to 78) Commo (terminate 67 to 78) Commo (terminate 67 to 78) S Commo (terminate 67 to 78) S Commo (terminate 67 to 78) B Cool 10 B Cool 10 Later (D03) Discrete Input [003] isolated ¹ Later (D04) Cool 10 Later (D05) Discrete Input [006] isolated ¹ R Lateret Input [01]	59		[R11]	Fixed to "Comma control is enabled	ind Ope	en GGB," if GG	ЪВ					_			60	0 Vac	52	
Image: Second	60		[R12]	Relay [R12] ^{*1} Preconfigured to	Alarm	class C, D, E o	r F	L L	M	lains voltage L	1							
R Image of participation D+ isolated, 8 to 40 Vdc ⁻² Connon (terminals 67 to 78) biocrete loput [D01] isolated ⁻¹ <u>Emained voltabel ⁻¹</u> 8 Connon (terminals 67 to 78) biocrete loput [D02] isolated ⁻¹ <u>Emained voltabel ⁻¹</u> 8 Connon (terminals 67 to 78) biocrete loput [D02] isolated ⁻¹ <u>Emained voltabel ⁻¹</u> 8 Connon (terminals 67 to 78) biocrete loput [D02] isolated ⁻¹ <u>Emained voltabel ⁻¹</u> 8 Connon (terminals 67 to 78) biocrete loput [D02] isolated ⁻¹ <u>Emained voltabel ⁻¹</u> 8 Connon (terminals 67 to 78) biocrete loput [D02] isolated ⁻¹ <u>Emained voltabel ⁻¹</u> 8 Connon (terminals 67 to 78) biocrete loput [D02] isolated ⁻¹ <u>Emained voltabel ⁻¹</u> 8 Connon (terminals 67 to 78) biocrete loput [D02] isolated ⁻¹ 10 to 2000 Am / 00 to 10 Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 2000 Am / 00 to 10) Analog input Type 1 (0 to 10) Analog input Type 1 (0 to 2000 Am	61			Earth						nalog output	[40.02]					-	20	
Image: Strate Property Isolated, 8 to 40 Vdc "2" Auxiliary excitation D+ isolated Image: Strate Property Isolated Image: Strate Property	62			NC					(+	+/-10Vdc / +/-	20mA /	PWM)		[AO 02]	+	19	
3 - Isolated, 8 to 40 Vdc ⁻² 3 - Analog output [AO 01] - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -	63	+		Power	supp	ly		3	ľ	onage blashig	,				co	Do not nnect !	18	
S Auxiliary exclution D+ isolated Speed Biasing [A0 01] + 9 S Common (terminals 67 to 78) Discrete Input (D01] isolated ¹¹ Fengine (A001) + 7 S EMX [D01] Discrete Input (D02] isolated ¹¹ Fengine (A001) + 7 S EMX [D03] Discrete Input (D03] isolated ¹¹ Fendie MCS - 7 R EMX [D03] Discrete Input (D03] isolated ¹¹ Fendie MCS - 7 R EMX [D06] Discrete Input (D06] isolated ¹¹ - 7 7 R EMX [D06] Discrete Input (D06] isolated ¹¹ - 7 7 R EMX [D06] Discrete Input (D06] isolated ¹¹ - 7 7 R EMX [D07] Discrete Input (D06] isolated ¹¹ - 7 7 R EMX [D00] Discrete Input (D07) isolated ¹¹ - 7 7 R EMX [D10] Discrete Input (D101) isolated ¹¹ - 7 7 R EMX	64	-		Isolate	ed, 8 t	o 40 Vdc ⁻²		⊲	A (+	nalog output +/-10Vdc / +/-	[AO 01] 20mA /	PWM)				-	17	
S Common (terminals 67 to 78) 5 EAX [D01] Discrete Input [D01] isolated ¹¹ 8 EAX [D02] Discrete Input [D03] isolated ¹¹ 8 EAX [D03] Discrete Input [D03] isolated ¹¹ 8 EAX [D04] Discrete Input [D03] isolated ¹¹ 8 EAX [D05] Discrete Input [D03] isolated ¹¹ 9 EAX [D06] Discrete Input [D06] isolated ¹¹ 1000 Discrete Input [D06] isolated ¹¹ Analog Input Type 1 (D05) Discrete Input [D06] isolated ¹¹ Image: Colored Input [D06] isolated ¹¹ 10 Discrete Input [D06] isolated ¹¹ Image: Colored Input [D06] isolated ¹¹ 11 Discrete Input [D06] isolated ¹¹ Image: Colored Input [D06] isolated ¹¹ 12 Discrete Input [D06] isolated ¹¹ Image: Colored Input [D06] isolated ¹¹ 12 Discrete Input [D06] isolated ¹¹ Image: Colored Input ID06] 13 Image: Colored Input ID06] Image: Colored Input ID06] 14 JSA [D11] Discrete Input ID11 14 JSA Image: Colored Input ID11 Image: Colored Input ID11	65			Auxilia isolate	iry ex d	citation D+		Ш	Ś	peed Biasing				[AO 01]	+	16	
Ext [D01] Discrete Input [D01] isolated '' [Al 03] + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + +	99			Con	nmon (i	terminals 67 to	78)									Engine GND	15	
8 Ext [D02] Discrete Input [D03] isolated 1 - n 8 Ext [D03] Discrete Input [D03] isolated 1 - n 8 Ext [D04] Discrete Input [D03] isolated 1 - n 8 Ext [D04] Discrete Input [D05] isolated 1 - n 8 Ext [D05] Discrete Input [D06] isolated 1 - n 10 Discrete Input [D07] isolated 1 - n n 10 Discrete Input [D07] isolated 1 - n n 10 Discrete Input [D07] isolated 1 - n n 10 Discrete Input [D07] isolated 1 - n n 10 Discrete Input [D07] isolated 1 - n n n 10 Discrete Input [D07] isolated 1 - n n n n 10 Discrete Input [D07] isolated 1 - - n n n n n 11 Discrete Input [D07] isolated 1 - - n n n n <td< td=""><td>67</td><td>¥**K</td><td>[D01]</td><td>Discrete Input [I Emergency Stop</td><td>D01] is</td><td>olated</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>[4] 03]</td><td></td><td>+</td><td>14</td></td<>	67	¥**K	[D01]	Discrete Input [I Emergency Stop	D01] is	olated								[4] 03]		+	14	
stat [D03] Discrete Input [D03] isolated '' k [D04] Discrete Input [D04] isolated '' codant temperature [OD3] Discrete Input [D04] isolated '' codant temperature [OD4] Discrete Input [D04] isolated '' R Back [D05] Discrete Input [D05] isolated '' R Back [D06] Discrete Input [D07] isolated '' R Back [D07] Discrete Input [D07] isolated '' R Back [D09] Discrete Input [D08] isolated '' R Back [D09] Picerete Input [D08] isolated '' R Back [D09] Picerete Input [D09] isolated '' R Back [D09] Picerete Input [D09] isolated '' R Back [D09] Picerete Input [D09] isolated '' R Back [D10] Discrete Input [D19] isolated '' R Back [D11] Discrete Input [D17] isolated '' Alam input or Neutral Contactor Alam input or Neutral Contactor I R + - - S - - - R <td>8</td> <td>¥*\$</td> <td>[D02]</td> <td>Discrete Input [I Start in Auto</td> <td>D02] is</td> <td>olated '</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>[, 00]</td> <td></td> <td>-</td> <td>13</td>	8	¥*\$	[D02]	Discrete Input [I Start in Auto	D02] is	olated '								[, 00]		-	13	
R Ext [D04] Discrete Input [D04] isolated '' - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -	69	¥**K	[D03]	Discrete Input [I Low oil pressure	D03] is	plated '			(0	to 2000 Ohm	/			[AI 02]		+	12	
R Discrete Input [D06] isolated '' Enable MCB F(Alam acknowledgement) Enable MCB	6	¥*\$	[D04]	Discrete Input [I Coolant tempera	D04] is ture	plated '		20	0/	'4 to 20mA / to 1V)						-	Ħ	
R Enable MCB Discrete Input [D06] isolated Redy: MCB open Image: Start input [D07] isolated Redy: MCB open Image: Start input [D07] isolated Redy: GCB open Image: Start input [D08] isolated Redy: GCB open Image: Start input Redy: Start input [D17] isolated Redy: GCB open Image: Start input Redy: Start	71	¥*K	[D05]	Discrete Input [I Alarm acknowled	D05] is Igemen	t		n N						[AI 01]		+	10	
R 1007 Discrete Input [D07] isolated Reity: KC80 open Image: Section open State	72	¥**K	[D06]	Discrete Input [I Enable MCB	D06] is	olated		⊲						L		-	6	
R 1: CAN_GND CAN#3 CAN#1 CAN#1 CAN#2 States	73	¥*K	[D07]	Discrete Input [I Reply: MCB oper	D07] is n	plated		Ш							L3	s1	**	
R Fixed to Reply GB point, if GGB cont, if GGB cont, if GGB control is enabled. Generator current (isolated) 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	74	¥*X	[D08]	Discrete Input [I Reply: GCB oper Discrete Input [I	D08] isi n D09] isi	plated	_									s2	~	
R 1 CM, GND CAN#3 CAN#1 CAN#1 CAN#1 CAN#1 CAN#1 State	75	¥*K	[D09]	Fixed to "Reply C control is enabled	GGB op d.	en", if GGB			G	enerator curre	ent				12	s1	9	
Image: space spac	76	¥**	[D10]	Discrete Input [I Fixed to "Load bu control is enabled	D 10] iso Usbar is 1	dead", if GGB	,		1/	A / 5A compat	ible					s2	2	
R - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - <th -<="" t<="" td=""><td>77</td><td>¥**</td><td>[D11]</td><td>Discrete Input [I Alarm input</td><td>D11] is</td><td>plated 1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>L1</td><td>s1</td><td>4</td></th>	<td>77</td> <td>¥**</td> <td>[D11]</td> <td>Discrete Input [I Alarm input</td> <td>D11] is</td> <td>plated 1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>L1</td> <td>s1</td> <td>4</td>	77	¥**	[D11]	Discrete Input [I Alarm input	D11] is	plated 1									L1	s1	4
R + Mains or Ground current (isolated) 1A / 5A compatible Mains or Ground current (isolated) 1A / 5A compatible 1: R5485, A 2: CM, GND 2: CM, SHELD 2: CM, SHELD	78		[D12]	Discrete Input [I Alarm input or Ne	D12] is eutral C	olated ontactor										s2	m	
8 - 1A / 5A compatible 52 -1 1A / 5A compatible 52 -1 1A / 5A compatible 52 -1 1 - 1000 1: CAN_GND 2: CAN_L CAN#3 2: CAN_L 2: CAN_L 2: CAN_L 3: CAN_SHELD 4: CAN_H CAN#1 CAN#2	79	+				MPU in	nput		M	ains Ground curre	ent (isola	ted)			L1	s1	2	
Signal 1: CAN_GND CAN#3 2: CAN_GND 2: CAN_GND 2: RS465, GNB 2: CAN_GND 2: CAN_GND 2: RS465, GNB 2: CAN_GND 2: CAN_GND 2: RS465, GNB 3: CAN_SHIED 4: CAN_GND 4: RS465, GNB 6: CAN_H CAN#1 CAN#2	80	-							1/	A / 5A compat	ible	,				s2	1	
VI E 3: CMR_SHIED 4: CAN_H CAN#1 S: CMR_SHIED 4: CAN_H CAN#2 4: R5465 SHIED 5: R5465 Y 6: R5465 Z b E	wə.	slanic	1: CAN_GND 2: CAN_L	CAN#3						1: CAN_ 2: CAN_	SND	RS48	5#1	1: RS485_A 2: RS485_B 3: RS485_GM	ID	ew	linals	
	Sc	terr	4: CAN_H	CAN#1						3: CAN_ 4: CAN_	H	CAN	#2	4. R3485_SF 5: RS485_Y 6: RS485_Z		Sci	tern	

Subject to technical modifications

^{*1} configurable via LogicsManager

KEA 350 Series Wiring DiagramPCB1

Fig. 6: Wiring diagram 1(2) KEA 350 RP-P2 / KEA 350 P2(-LT)

Pin 61: Metal housing: don't use; Plastic housing with HMI/display: Earth/ground



							٦	
							 [
	[R13]		Busbar	voltage	Ν	600 Vac	119 12	
	[R14]		Busbar	voltage	L3	600 Vac	118	
25 124							16 117	
	[R15]		00				115 1	
127	[R16]		Analog	output [AO 06]		+ isolated	114	
29 128				zoma)			12 113	
	[R17]	Relay outputs	Analog (0/4 to	output [AO 05] 20mA)		isolated _	111 1	
131	[R18]	(isolateu)	Analog	output [AO 04]		+ isolated	110	
				20mA)			8 109	
134 13	[R19]		Analog (0/4 to	output [AO 03] 20mA)		isolated	107 10	
135	[R20]		Ĕ				106	
37 136			5				04 105	
	[R21]		Analog	Input Type 3 (Al	7-10)	3	103 10	
	[R22]		Analog i (0 to 25	nput [Al 10] 0 Ohm / 0 to 2500	Ohm)	2	102	
	(540)					3	00 101	
27 1¥3×4	[D13] [D14]		Analog	input [Al 09] 0.0hm / 0 to 250) Ohm)	2	99 10	
	[D15]			0 011117 0 10 2500	, chiny	1	86	
144	[D16]		Analog	input [Al 08]		3	6 97	
14 14 14 14 14 14 14 14	[D17]	Discrete inputs	(0 to 25	0 Ohm / 0 to 2500) Ohm)	1	95	
	[D19]	(isolated)	2	2		3	94	
87 87 87	[D20]		Analog (0 to 25	nput [Al 07] 0 Ohm / 0 to 2500	Ohm)	2	8	
	[D21]		LS Analog	Input Type 2 (Al	4-6)	1 ٹے	91 92	
	[D23]		Analog i (0/4 to 2	nput [Al 06] 20mA / 0 to 10V)		Ų	. 6	-n-i
122	Common (terminals 141 to	o 151)				-	68	
12		Sinking output [TO2] (isolated)		nput [Al 05]		Ę	87 88	
155			(0/4 to .	20mA / 0 to 10V)			86	for 2
7 156			Analogi	nput [AI 04]		ſ	85	OmA
158 15.			(0/4 to 2	20mA / 0 to 10V)		۲_ -	83 84	
159			Sinking	output [TO1]			. 82	
160			(isolate	(k	1: RS485 A		81	
				RS485#2	2: RS485_B 3: RS485_GND 4: RS485_SHIELD 5: RS485_Y	Screw	terminals	
Subject to technica	al modifications				6: RS485_Z KEA 350 Serie	es Wiring Diagram Pi		l

Fig. 7: Wiring diagram 2(2) KEA 350 RP-P2 / KEA 350 P2(-LT)



3 Front Panel Access



The following chapters only apply to model with front panel and display.

Front Panel / HMI / display

Please see chapter for detailed description of the front panel with display and buttons.



Buttons can be disabled by ToolKit with parameter 12978 p. 163/ S. 1038 "Lock keypad".

3.1.1 Basic Navigation

Main screen

After power-up the control unit displays the main screen / HOME screen (Fig. 8).

The main screen can be divided into the following basic sections:



Fig. 8: Main screen

- 1 Values
- 2 Status Messages
- 3 Alarm Messages
- 4 Single Line Diagram
- 5 Current Softkey Functions



Values [1]

The "values" section (Fig. 83/1) of the screen illustrates all measured power related information including voltages, currents, frequencies, power, and power factor values.



If the mains data display is disabled, the main screen will only show generator data with bigger digits.

The section's content changes based on the selected sub-menu screen. For information on specialized menu screens refer to Chapter 4.1.5 "Specialized Menu Screens" on page 121.

Status messages [2]

The "status message" section (Fig. 83/2) of the screen shows the actual operating information.



For a list of all operation states refer to Chapter 9.5.3 "Status Messages" on page 1079.

Alarm messages [3]

The "alarm message" section (Fig. 83/3) of the screen shows the last alarm message that is occurred and not yet acknowledged.



For a list of all alarm messages refer to Chapter 9.5.4.2 "Alarm Messages" on page 1084.

Single line diagram [4]

The single line diagram (Fig. 83/4) shows the current status of the engine and power circuit breakers.



This section is also used for manual operation of the genset. For additional information refer to Chapter 5.2.2 "Operating Mode MANUAL" on page 572.

Softkeys [5]

The softkeys (Fig. 83/5) permit navigation between screens, levels and functions as well as configuration and operation.

Group	Softkey	Caption	Description
Display	⅔	Display Mode	Next step to display all measured (delta/wye) voltages one after the other.
		Customer configurable	Change to "customer specific screen 1 (or 2)"
	Cust. 1	screen 1 (and 2)	Notes The name of this softbuttons is configurable, too.



Group	Softkey	Caption	Description
	Can 1	CAN 1	Change to "CAN interface 1 state" screen.
	Can 2	CAN 2	Change to "CAN interface 2 state" screen.
	Ext. I/O	Ext. I/O	Change to external discrete I/Os screen.
	Int. I/O	Int. I/O	Change to internal discrete I/Os screen.
	J.	Reset Value Display	Reset the maximum value display.
	4	Reset Maintenance	Reset the maintenance counter.
Operation	+	Increase Value	Increase selected value.
	-	Decrease Value	Decrease selected value.
	ل ه	Confirm Input	Confirm and store changed value.
	✓	Acknowledge Message	Acknowledge/Delete message/event.
	<u>*</u>	Open Breaker	Open mains/generator breaker (MANUAL mode).
	-(- -	Close Breaker	Close mains/generator breaker (MANUAL mode).
	Code req.	Code req.	Request a blink code for one error message from the ECU. Repeated pressing of this softkey displays all stored error mes- sages (J1939 Special Screen).
	Reset	Reset	Reset the blink code (J1939 Special Screen).
Navigation	Ť	Move Up	Select previous value/entry.
	Ŧ	Move Down	Select next value/entry.
	→	Move Cursor Position	Move cursor position
	۲	Return	Return to previous menu.
	Next Page	Next Page	Go to following page/screen of the current menu.
	Para- meter	Parameter Screen	Show parameter screen.
	Alarm	Alarm Screen	Show alarm screen.



Status symbols

Menu screen	Symbol	Caption	Description
Main Screen	VE2	Voltage Display Mode	The index of the symbol indicates whether delta or wye voltage is displayed and which phases are displayed.
	VES		
	VER		
	VN1		
	$V_{\rm N}^{\rm L2}$		
	$V_{\rm N}^{\rm L3}$		
Single Line Dia- gra	•••••••••••••••••••••••••••••••••••••••	Rotating Field CW	Generator, mains or busbar rotating field moves clockwise.
	G	Rotating Field CCW	Generator, mains or busbar rotating field moves counter-clock- wise.
	N	Power Detected	Power is detected at the respective measuring point (generator, busbar or mains).
	⊘	Monitoring Enabled	Indicates that the engine delayed monitoring has expired and the monitoring functions are enabled.
	÷	Power Imported	Power is imported (at mains interchange).
	•	Power Exported	Power is exported (at mains interchange).
Alarm List	٢	Alarm Condition Present	Indicates that corresponding alarm condition is still present.
	A!	Alarm class A/B/C/D/E/F present	Symbol with "!" indicates that an alarm of class A/B/C/D/E/F is present.
	D	Alarm class A/B/C/D/E/F not present	Symbol without "!" indicates that an alarm of class A/B/C/D/E/F is not present.
Setpoints	6	Generator Power	Indicates the generator power (actual value).
	\odot	Mains Power	Indicates the mains power (actual value).
Synchroscope	ç	Phase Angle	Indicates the actual phase angle between busbar and mains or busbar and generator.
Sequencing		Breaker Closed	GCB of respective genset in sequence is closed.
	•] •	Breaker Open	GCB of respective genset in sequence is open.
		Add-on	Generator is becoming "Add-on" to the (multiple) genset system.
	-	Add-off	Generator is going "Add-off" from the (multiple) genset system.
LogicsManager	L	Delay ON	Delay before output becomes TRUE.
	l	Delay OFF	Delay before output becomes FALSE.
		TRUE/enabled	Variable is TRUE (LogicsManager).
			The bit is enabled (CAN Interface).
			Relay activated (Discrete Outputs)
		FALSE/disabled	Variable is FALSE (LogicsManager).
			Relay deactivated (Discrete Outputs)





The following chapters list notes related to the specific menu screens.

For information on standard softkeys and status symbols refer to Chapter 4.1.1 "Basic Navigation" on page 112.

3.1.2 The HOME Screen

General notes

	GCB of	pen		GCB	fail to over	
Δ_{1}	Mains			0.00		Alarm
	VE2	00.	0V	Р	00.0kW	_
Cust	f	00.	0Hz	PF		Papar
tust. 1	00	ØA				meter
	Gener	ator			Øs	
Cust.	VE2	00.	Θ۷ –	Р	000kW	Next
2	-					
۷	†'	ØØ.	0Hz	\mathbf{PF}		Page
2	17 100	00. 0A	0Hz 00	PF ØÂ	000A	Page
د ۲۰۰۰	f 00 11	00. 0A	0Hz 00	PF ØA	000A	Page

Fig. 8: HOME page/screen

- The "Home" button is a one-click way back to the overview starting point: the HOME page / HOME screen
- The "Home Screen" offers display alternatives via parameter 4103 p. 163 " Home screen data"
 - Generator
 - Generator/Mains
 - Generator/Busbar
 - Generator/Engine
 - Generator/LS-5
 - Generator/Mains (LS5)
- To display the single line diagram with/without mains is selectable via parameter 4129 p. 163 "Oneline diagram with mains"
- Two customizable buttons enable selection of indications to display engine and auxiliary values (full access via ToolKit, name/description cannot be changed via HMI)
- Find menu: "Parameter → Configure HMI
 → Configure customer screen x"
- Two display brightness levels can be switched by LogicsManager. Can be used for e.g.:
 - Key activation determined
 - Brightness reduction on navigation bridge (vessels)
 - Saving energy
- Find menu: "Parameter Configure HMI
 → Configure display"
- Lock keypad function is determined by LogicsManager 12978 p. 163/ p. 1038. Result is available as logical command variable 11924 p. 1017/ p. 1028 (and can be used with 86.30).

Find menu (ToolKit only!): "Parameter → Configure HMI → Configure display"



Display alternatives

The HOME screen allows a number of pre-selectable and soft- button controlled display variants.

- Generator
 - Voltages (pp pn) selectable via softbutton [1]
 - Power
 - Power Factor PF
 - Frequency
 - Currents (L1, L2, L3)
- Generator/Mains
 - Generator values as described above and additionally for Mains
 - Voltage
 - Frequency
 - Current
 - Power
 - Power factor
- Generator/Busbar
 - Generator values as described above and additionally for Busbar
 - Voltage
 - Power
 - Frequency
- Generator/Engines
 - Generator values as described above and additionally for Engine
 - Engine speed (rpm)
 - Soll pressure (bar or psi)
 - &Water temperature (°C or °F)
 - **()** Operating hours (h)
 - Battery voltage (V)
 - 🗈 Fuel level (%)
- Generator/LS-5
 - Generator values as described above and additionally for LS-5
 - Voltage
 - Power
 - Frequency



- Generator/Mains (LS5)
 - Generator values as described above and additionally for mains values measured by LS-5, if an application mode (parameter 3444 p. 251) with L-MCB is selected.
 - Voltage
 - Power
 - Frequency

	Configure HMI Parameter System Overview	7
Lore seven deta Oneline diagram with mains AM Engine speed AM Engine oil pressure AM Engine hours	Generator/Rusbar On	
AM Engine fuel level AM Engine batt.voltage AM Engine coolant temp.	₹	

Fig. 9: AnalogManagers for "Engine" values at Home Screen



Engines" parameter selection

The values to be displayed at "Engines" can be selected via AnalogManager definition of the parameters at "Parameter

- → Configure HMI
- → Screen configuration". Menu texts and symbols cannot be changed!

4 Operation

In operation the genset controller can be manually or remote controlled.

Front panel access is described in chapter 4.1 "Front Panel Access" on page 112.

Access via ToolKit is described in chapter 4.2.6 "View And Set Values In ToolKit" on page 147.

Access via Remote Panel RP 300 is described in chapter and the Technical Manual "37593 RP 300" .

Access via PLC depends on the interface and the data telegram used for communication.



For menu structure/menu tree see "Menu structure (menu tree)" on page 110.



4.1 Power ON

Behavior during starting KEA 3X0

The start-up procedure of the KEA 3X0 device can be caused by the following reasons:

- Power ON
- Power cycling e.g. by 1701 p. 181 " Set factory default values"
- Power is back after voltage drop

This process is visualized by the HMI of the plastic housing version or the LEDs of the metal housing version.



Using the USB Service Port

With power ON and a PC/laptop connected via USB service port it can happen that the USB window that pops up doesn't show all files and/or the correct available free memory at the device: Please unplug/plug the USB connection after the KEA finished starting.

With power ON and connected USB service port it can happen that a connected USB device is not detected correctly: Please unplug/plug the USB connection after the KEA finished starting.

With power cycle of the KEA 3X0 the USB connection is lost: Please unplug/plug and/or start USB connection again after the KEA finished starting.

... starting plastic housing (HMI) version

Power ON from zero power

- Buttons are illuminated
- Start-up screen appears
 - the red bar at the bottom monitors the degree of fulfillment
- HOME screen appears with measured values and state information
 - Illumination of buttons is disabled according to the default settings STOP button still might be illuminated
 - WARNING triangle is blinking if there are unacknowledged alarm messages

Power cycling

- Warning LED is twinkling in a high frequency
- (afterwards the standard process of Power ON is executed:)
- Buttons are illuminated
- Start-up screen appears
 - the red bar at the bottom monitors the degree of fulfillment
- HOME screen appears with the same measured values and state information as before power cycling
- ... starting metal housing version



Power ON from zero power

- LEDs are twinkling
- LEDs are illuminated according to the state of the genset control

Power cycling

- Warning LED is twinkling in a high frequency
- (afterwards the standard process of Power ON is executed:)
- LEDs are twinkling
- LEDs are illuminated according to the state of the genset control

4.2 Change Operating Modes

Startup

The genset controls starts in the operating mode defined by parameter 1795 [Startup in mode]. Refer to Chapter 4.4.5. "Configure Operation Modes" on page 338 for details.

Select Operation Mode

Operation modes can be selected via

- front panel buttons (plastic housing variant or Remote Panel RP 300 or VNC client),
- HMI configuration (plastic housing variant or Remote Panel RP 300 or VNC client),
- remote settings via interfaces, or
- ToolKit

The following chapters describe the manually front panel access.

4.2.1 Operating Mode STOP

Usage



Use the STOP button to activate operating mode STOP.



Observe the notes on the system's reaction upon activation of operating mode STOP as listed below.

⇒ STOP LED is illuminated at the front panel; ToolKit home page shows STOP icon left beside the prime mover.

System reaction

In operating mode STOP neither the engine nor the GCB can be operated. Dependent on the application mode the power circuit breakers cannot be operated.





CAUTION!

Hazards due to improper use of operating mode STOP

Selecting the operating mode STOP is not the same as an EMERGENCY STOP.

In some cases the KEA will perform additional logic functions, such as an engine cool down period, before the engine is stopped.

- For emergency stop functionality use an EMERGENCY STOP discrete input, programmed as an F class alarm.

If the operating mode STOP is selected while the engine was already stopped the following applies:

- The GCB will not be closed.
- The fuel solenoid relay will not be enabled.
- The start request is ignored.
- The start push buttons (softkeys) are disabled.
- The engine/generator monitoring remains activated (exception: all monitoring that is delayed by the engine speed).

If the operating mode STOP is selected while the engine was running the following applies:

- Dependent on the current application mode a soft shut down will be executed.
- Pressing the STOP button again opens the GCB.
- If the STOP button is pressed again, the cool down will be interrupted.

If the operating mode STOP is selected while the engine performs a cool down the following applies:

• Pressing the STOP button again causes an immediate stop of the cool down and stops the engine.



If the conditions of the LogicsManager function "Enable MCB" (parameter 12923 p. 263/ p. 1038) are TRUE, the MCB will be closed again if it is open in STOP operating mode.

4.2.2 Operating Mode MANUAL

General usage

In the MANUAL operating mode (mode button "MAN" illuminated) both the engine circuit breaker and the power circuit breaker can be operated via the push buttons along the bottom of the display (softkeys). Additionally the Start(I)/Stop(O) buttons can be used to start or stop the engine.

1



- Mode button: MAN
- 2 START button: Engine
- 3 STOP button: Engine
- 4...6 Soft buttons: Breaker OPEN/CLOSE





Use the mode button "MAN" to activate operating mode MANUAL. ⇒ The MAN button is illuminated.



The breakers will open immediately without power reduction. To open the breaker in a no-load condition, reduce the load manually in the setpoints screen (Chapter 4.1.5 "Specialized Menu Screens" on page 121).

Example for application mode A01

To start the engine:



▶ Press the button [I] below the MAN button.

⇒Success: The engine starts and the circular arrow and the eye symbol appear. Failure: No change in the display until the "start failure" message appears.

To stop the engine:



▶ Press the button [0] right below the MAN button.

⇒Success: The engine stops and the circular arrow and the eye symbol disappear. Failure: No change in the display until the "stop failure" message appears.





Overview

Function/Status	Symbol	nbol Available in application mode											
		A01	A02	A03	A04	A05	A06	A07	A08	A09	A10	A11	
Start/running engine		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Stop/stand still engine	/ /	✓	✓	~	✓	✓	✓	✓	~	✓	~	✓	
Breaker open command is issued or a clo- sure of the breaker is blocked	-×-		✓										
No defined breaker state			✓										
Open the GCB				✓	~	~	~	~	✓	~	✓	~	
Close the GCB				✓	~	~	~	~	~	~	√	~	
Open the GGB ¹	- · v					✓	✓			✓	√	~	
Close the GGB ¹						~	~			~	√	~	
Open the MCB					~		✓		√	~		~	
Close the MCB					✓		✓		√	√		✓	



¹ The GGB can not be operated via softkey.



Symbol	Description
Ð	Generator or mains rotating field moves clockwise.
G	Generator or mains rotating field moves counter-clockwise.
~	Power is detected at the respective measuring point (generator, busbar, or mains).
•	Indicates that the engine delayed monitoring has expired and the monitoring functions are enabled.
÷	Power is imported (at mains interchange).
*	Power is exported (at mains interchange).

Table 1: Status symbols

4.2.3 Operating Mode AUTOMATIC

General usage

In the AUTOMATIC operating mode ("AUTO"), all engine, GCB, and/or MCB functions are operated via an interface, or automatically by the control unit (i.e. a mains failure).



The function of the KEA depends on the configuration of the unit and how the external signals are used.



• Use the button [AUTO] to activate operating mode AUTOMATIC.

⇒ If mode change was successful the button [AUTO] is illuminated.



For a more detailed description of the start/stop sequence of the engine and the associated parameters refer to Chapter 4.4.5.2 "Operation Mode AUTO - Automatic Run" on page 339.

The main functions are briefly described in the following sections.

Start engine

The engine is started via a remote start signal.

Prerequisites:

- The AUTOMATIC operating mode is enabled.
- The start request is enabled by the LogicsManager "Start req. in AUTO".
- No shut down alarm is present. (for explanation of the alarm classes refer to Chapter 9.5.1 "Alarm Classes" on page 1078).
- The engine is ready for operation.
- The GCB is open.



Auto mains failure operation (AMF)



Auto mains failure operation is only available in application mode 403,

(A06), (A07), (A08), (A09) and (A11).

If the AUTOMATIC operating mode is enabled and the mains fail, the engine and the power circuit breakers will be operated according to the current application mode.

Prerequisites:

- The AUTOMATIC operating mode is enabled.
- The parameter "Emergency power" is configured to "On".
- The configured mains failure limits are reached.
- The configured delay times have expired.
- No shut down alarm is present. (for explanation of the alarm classes refer to Chapter 9.5.1 "Alarm Classes" on page 1078).
- The engine is ready for operation.

4.2.4 Operating Mode TEST

General usage

The operating mode ("TEST") usually is a temporary operating mode. The idea is to test the genset.

TEST operating mode always starts the engine, when changing into this mode independent on an AUTOMATIC start order. Additionally the TEST operating mode supports the emergency and critical run as well (if a mains failure occurs during the test run). The operating mode TEST supports different sub modes so the operator can choose if the breakers shall be closed during test run or whether the operating mode is changed after the test run.



The function of the KEA depends on the configuration of the unit and how the external signals are used.



Use the button [TEST] to activate operating mode TEST.

 \Rightarrow If mode change was successful the button [TEST] is illuminated.



The illumination of the button becomes twinkling a short time before TEST run is over. For a more detailed description of the start/stop sequence of the engine and the associated parameters refer to Chapter 4.4.5.3 "Operation Mode TEST" on page 341.

The main functions are briefly described in the following sections.

4.3 Restore Language Setting via HMI, Buttons and Softkeys

In order to change the language setting via HMI, press the (soft)keys in the following order:





Language parameter is on code level "0", so the instruction will work with each code level.



Fig. 11: Front panel and display

- 1. Press button [HOME] once to return to the start screen
- 2. Press softkey [6] once to access the "Parameter" screen
- 3. Press softkey [3] once to access the "Configure language / clock" screen
- 4. Press softkey [7] once to edit the language setting
- 5. Press softkeys [11] or [12] to select the desired language.
- 6. Press softkey [7] once to commit the language setting.
 - \Rightarrow The desired display language is restored.