01.01	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
This short form guide relates to SW 01.01 of 2018/10/30					Please always use short form guide matching the controller SW !	

Common Legend to this document

		"_"	A blank display position is depicted by the underline character for readability		"____" = blank display	
			gray shaded menu items can be used only with a special password or are yet not implemented			

Common LED Coding without user's intervention

		all LEDs are lighting	Lamp Test (after reset lasting 2 seconds)		
		LED is off	action / property / reading is inactive (at green "Auto"/"cos phi": regulation is suspended)		
		LED lights	action / property / reading is active		
		red Alarm LED lights	alarm is active, no alarm switch-off of steps, or		
			alarm with alarm switch-off of steps is active	"-AL-" (displayed at times)	
		red Steps LED blinks	step in error but without alarm switch-off, e.g. duty period alarm, etc.		
		red Steps LED lights	step is inoperative due to defect analysis, e.g. resonence, step power loss, etc.		

Common LED Coding during user's access

		One LED lights within the left-sided vertical LED ribbon at "Auto" or "Service", or fastly flashes within "Alarm", or		
		One "Steps" LED fastly flashes (=2.5 Hz)	= position of the menu cursor respective steps cursor	
		"Info" or "Set" blinks	The menu cursor resides within the menu tree; menu item at numerical display, e.g. "H1.13"	
		"Man" blinks	Manual Mode is active	(slow blinking at 1,25Hz)
		One red "Steps" LED	= Steps Cursor, i.e. the reading shown at the numerical display refers to that step, e.g. the	
		is fastly flashing	the steps size of commissioning result, or that step is selected for switching in manual mode	
		"Set" blinks, "Info" on	= result display ("Info") by an action ("Set") during commissioning; one green LED may blink, too	
		One LED within the left-sided vertical LED ribbon at "Auto" or LED "Alarm"/"cos pi" slowly blinks		
			any parameter related to the LEDs item is going to be changed.	(slow blinking at 1,25Hz)

Common LED Coding at the Numerical Display including the "cap"/"ind" LEDs; Number Entry

		Number with cap/ind	Number Display; "cap"/"ind" work as sign prefix for cos phi values or reactive power	
		whole number blinks	displayed number in error (e.g. current reading before current transducer entered)	
		single digit blinks	= position of the numerical Cursor at number entry; that digit can be changed. During Entry the	
			number is shown 4 digits with leading zeroes, but the numerical cursor omits unchangeable	
			digits and figures; e.g. for the maximum number 615 the cursor begins at the second left digit	
		▼	"0(0)00"; use the arrow down key ▼ to change that digit from 0 to 6 thus limiting input to 699.	
		cap/ind fastly flashes	select cap/ind as "sign" digit; ▼ toggles between them; use ► to proceed to the next digit	
		►,SET	►: proceed right to the next digit; ► at therightmost digit or SET anywhere closes the input	
		The whole numerical display flashes very fast, or 4 digits with the upper and lower segments only, or 4 dots only		
			input / displayed number is invalid, e.g. > 4 digits, or unknown format	"====" or "...."

Left-sided vertical LED Ribbon, Auto + Service

	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
	0	▼	Auto/cos phi	cos phi display during	show the actual cos phi -	cap/ind "_0.68"
			stays off	alarm switch-off of steps	automatic regulation stopped	
	1	▼	Auto/cos phi	cos phi	show the actual cos phi	cap/ind "_0.98"
	0/1	►	... blinks	change target cos phi (actual tariff 1/2 indicated as "t1__" / "t2__")		normal operation only
	2	▼	Auto/THDU	THDU	show the actual THDUin %	"__2.7" in 1/10%
		►	... blinks	change alarm threshold THDU in %		normal operation only
	3	▼	Auto/U(V)	U	show the actual Urms in V (not U1 !)	"_225" in V
		►	... blinks	change voltage transducer ratio		commissioning only
		►	... blinks	change alarm threshold Umin in % of Umains		normal operation
	4	▼	Auto/I(A)	I	show the actual Irms in A (not I1 !)	"__70" in A
		►	... blinks	change current transducer ratio (ctr)		commissioning only
		►	... blinks	change inrush surge current dead time in seconds		normal operation
	5	▼	Service/ΔQ	Delta Q=Qmiss.to target cos phi	show actual Qmissing (minus =cap.)	"_-12" in kvar (without cap LED)
	6	▼	Service/Info	menu tree "Info"	after entry by ► or SET ...	"InFo"
	7	▼	Service/Man	manual mode	... the yellow Man LED blinks /	"_MAn"
	8	▼	Service/Set	Menu tree "Set"	... the yellow Info or Set LED blinks	"Set_"
				no alarm: round robin --> 1		

Left-sided vertical LED Ribbon, Alarm

	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
	9 -	▼	any Alarm	alarm without switch-off	e.g. red LED Steps =duty period	concerned Steps LEDs on/blink
	13		LED lights	or with switch-off of steps	e.g. red LED U =low voltage	"-AL-"=Alarmabschaltung
			not lighting alarm LEDs are skipped by the menu cursor			
		▼		round robin: without alarm switch-off of steps --> 1; with alarm switch-off of steps --> 0		

Standard Screens

		♦	Falls back into one of the standard screens after 3 min. without keystroke, long-term action, and result display		
	1		/ or 0	standard screen while normal operation	regulation is active / is off
	3			standard screen during commissioning	
	7			standard screen while manual mode is active	

01.01	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input

Other Alarms / Special Alarm Screens

			one alarm LED fastly flashes	=alarm LED selected by the menu curcor	Num. Display shows the highest priority new alarm for that LED	"AL.20" = single harmonics (the red THDU LED is flashing)
		SET	one alarm LED fastly flashes	=acknowledge the alarm displayed for that LED	the alarm of that LED group with next less priority is displayed	"AL21" = THDU alarm (with the red Alarm/THDU LED flashing)
			Note: after acknowledging the last alarm of one group that alarm may still remain displayed. Please proceed the menu cursor yourself by ▼.			
			Alarm w/o assigned LED	Special alarms, e.g. excess temperature	Num. Display shows the highest priority new alarm of that group	"AL.24" = excess temperature (displayed at times)
		SET	cursor at LED Auto/cos phi	acknowledge displayed alarm w/o LED assigned	Num. Display shows the alarm of that LED group with next less prio	"AL23" = frequency alarm (displayed at times)
				special case: SW error with additional information	here: frequency to unstable to be measured (=error: 88, info: 0x0200)	"AL29"/"__88"/"_200"
				spec. alarm screen indicating acknowledged alarms still active		"AL…" (displayed at times)
			Display "AL…"	due to restore acknowledged but still active alarms		use menu item C0._8
			Display "-AL-"	alarm switch-off of steps is activated; alarm screen will remove with last switch-off reason		

Password Request

			Display "Pwd="	= password request; start entry with SET or ▼, edit number using ▼ and ►; check entry by SET.		
			"Pwd_" / "=Err"	on error retry password entry with SET or abort password request using ESC		
				Some menu items have forgotten the initial SET after password entry, so repeat SET if the menu got stuck.		
				During commissioning no service password is required; but the service password itself remans unchanged.		

Manual Mode (MAN)

	0		LED "Man" on	"_Man" displayeed, no	= menu cursor resides at the	= ... manual mode inactive
	1		"Man" blinks	Steps LED is fastly flashing	"Man" LED; manual mode= ...	= ... manual mode active
	2	SET or ►	LED "Man" on (/ blinks)	(re-) entrance into manual mode's action menu	step 1 is selected for switching, so red Steps LED 1 fastly flashes	when password protected enter the service password
		duration about 3s	Man LED flashes very fast (5Hz)	when entrance into the action menu didn't work	manual mode not possible	
	3	►		select the next step	selected step's LED fastly flashes	round robin, idle between step 8 and 1
	4	▼ or SET		toggle state on/off of step when possible		green LED on = step on (green LED lights when red LED pauses)
		duration about 3s	Steps LED flashes very fast (5Hz)	after trying to switch the step's state to "on"	switch on refused, e.g. idling time is still running, alarm switch-off, or resonance	
	5	►	only LED "Man" blinks	Display: "_Man", no fastly flashing red Steps LED	=menu cursor resides at Man LED, no step selected / standard screen	manual mode still active; leave manual mode (temporarely)
	6	item 5, then ▼		manual mode temporarely left, e.g. to show readings	use the menu cursor to navigate throughout the whole menu space	at first LED "Set" lights (LED "Man" is still blinking)
	7	item 5, then ESC		exit manual mode	immediately switch off forbidden step combinations, then start regulation in in automatic mode	directly fall back to the standard screen prior to "Man", e.g. Auto/cos phi

Emergency Stop, Reconnection, Reset

		ESC + SET 3s		HALT!, emergency stop (operation mode "StoP")	works in all operation modes (in commissioning not necessary)	Display shows operation mode "StoP" at times
		▼ + ► 3s	when in Stop mode	reconnection to the mode prior to (emergency) stop	passes Reset / Restart (indicated by 2s lamp test)	when password protected enter the service password
		▼ + ► 3s	elsewise	SW Reset (op. mode persists)	passes Reset / Restart (indicated by 2s lamp test)	when password protected enter the service password

Start Auto-Commissioning from comissioning mode

		▼ + ► 3s	= SW-Reset	Start Auto-Commissioning (same as menu item "In._2")	(no automatic start at Power On to allow different persons for install. and commiss.)	(from automatic mode at first use "In._2" to re-enter commiss. Mode)
		result display: net config.		e.g. Please approve: cos phi=0.67, phas angle=180°, mains voltage=400V		"APPr"/"ConF"/"_0.67"/"180°"/"_400"
		result display: transducer		e.g. Please approve: current transducer ratio (ctr)=120, total current=327A		"APPr"/"I.ctr"/"_120"/"I.tot"/"_327"
		result display: steps sizes		e.g. Please approve: steps powers: in total=200kvar, summed from: 24, 25,...		"APPr"/"SIZE"/"_200"/"__24"/"__26"/..
		Auto-Commiss. Finished		after message passes Reset / Restart (indicated by 2s lamp test)		"SELF"/"InIt"/"donE."
		ESC		terminate unintentionally started auto-commiss.	passes Reset / Restart (indicated by 2s lamp test)	confirm assurance query "SUrE""_to_" /"Abrt" by SET
		Error Codes on Abort of Auto-Commissioning				"Err.7" e.g. error no. 7
			1=abort by user (ESC key), 2=auto-gauge/enter net configuration before, 3=enter/auto-size steps sizes before (2,3			
			after in.15), 4=ALL steps unpopulated (=result of auto-gauging/sizing), 5=SE Mode not solved, 6=catenation preset			
			does not match the system, 7,8=timeout on auto-gauging/auto-sizing, 9=SE Mode presets do not match the system			

01.01	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input

Menu Tree Info

	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
	0		LED Service / Info lights	Info menu, menu cursor resides at LED Service/Info	select Info menu series by ▶	"InFo"
	1	▶,SET	LED Info blinks	"C1" Series Info Basic	series selection	"C1__"
	2	▶	LED Info blinks	"M" Series Measurement	series selection	"M___"
				Note: "M" looks at the 7-segment display like an upside down "U" and needs practice for accustoming		
	3	▶	LED Info blinks	"H" Series Harmonics Info	series selection	"H___"
	4	▶	LED Info blinks	"S" Series Steps Info	series selection	"S___"
	5	▶	LED Info blinks	"A" Series Alarm Info	series selection	"A___"
		▶		round robin --> 0		

Info Series Basic "C1" (=identical in the BASIC Controller)

	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
	0		LED Info blinks	"C1" Series Info Basic		"C1__"
	1	▼,SET	C1._1	I1 real, actual reading in A		
	2	▼	C1._2	I1 reactive, actual reading		
	3	▼	C1._3	THDI in %		
	4	▼	C1._4	Q on (U,f-corrected) in kvar		
	5	▼	C1._5	Show all data generated during commissioning (net-/step-data), start by SET (automatically proceeds every 2s; may be accelerated by ▶)		"C1._5"/"180°"/"_400"/"_120"/ "_200"/"__24"/"__26"/"__51"...
				=phase angle=180° (N-L1), mains voltage=400V, current transducer ratio (ctr)=120, step power in total=200kvar, steps=24, 26, 51,... Kvar		
	6	▼	C1._6	Power Loss per step in %	▶ for step selection	start by SET
	7	▼	C1._7	Show the Raw Measurement Readings at controller contacts, start by SET (automatically proceeds every 2s; may be accelerated by ▶)		"C1._7"/"_231."/"_2.37"/"50.08" =. 231V, 2,37A, ca. 50,1Hz
	8	▼	C1._8	Software Version	01.01, 01.02, ... ,2.01, ...	
	9	▼	C1._9	Serial Number of Hardware	0001, 0002, ... (without date code)	
	10	▼	C1.10	Controller Type (8T, 4T4K)	skipped at standard type 8K	"8t__", "4t4h", ("8h__" for 8K)
		▼		round robin --> 0		

Info Series "M" (▼,▶ Matrix)

	Item	Key	Series / Line	Measurement Series	▶ Column Selection: Categories 1..13 round robin	
	0			LED Info blinks	"M" Series Measurement	"M___"
	1	▼,SET	M1	actual readings	category options, see below	(new value every 0.3sec .. 2.5sec; flicker suppression with 1.5sec)
	2	▼	M2	maximum of act. readings	category options, see below	
	3	▼	M3	minimum of act. readings	category options, see below	
	4	▼	M4	act. readings, 1/4h average	category options, see below	
	5	▼	M5	maximum of 1/4h average	category options, see below	
	6	▼	M6	minimum of 1/4h average	category options, see below	
		▼		round robin --> 0		

... Measurement Categories

	Item	Key		Category		
	1	▶	Mx._1	Irms=total current through transducer in A, incl. Harm. (not I1 !)		
	2	▶	Mx._2	I1S=apparent current share of fundamental in A		
	3	▶	Mx._3	I1P=real current share of fundamental in A		
	4	▶	Mx._4	I1Q=reaktive current share of fundamental in A		
	5	▶	Mx._5	Urms= total mains voltage in V, including harmonics (not U1 !)		
	6	▶	Mx._6	P1=real power of fundamental in kW		
	7	▶	Mx._7	Q1=reactive power of fundamental in kvar (with cap/ind LEDs), NV		
	8	▶	Mx._8	Qon=compensation power (in effect=U,f corrected)		
	9	▶	Mx._9	Qmiss=ΔQ=compensation power missing to reach target cos phi (at nominal U,f)		
	10	▶	Mx.10	cos phi, HV, i.e. with fixed compensation power at medium voltage side		
	11	▶	Mx.11	cos phi, NV, i.e. as measured at the transducer (at low voltage side with fixed compensation power)		
	12	▶	Mx.12	temperature in Celsius degrees at the controllers rear plus temperature Offset P0.18		
	13	▶	Mx.13	frequency of measured voltage in Hz		
		▶		round robin --> 1		
				Note: Irms, Urms incl. harmonics; I1, U1, P1, Q1 are the fundamental shares only from Irms, Urms, ...; categories 7..11 with cap/ind LEDs as sign		

Info Series "H", "S", "A" (▼,► Matrixes)

01.01	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
	"H"		Series / Line	Harmonics Series	► Column Selection: Harmonical Index 0..31 round robin	
	0		LED Info blinks	"H" Series Harmonics		"H___"
	1	▼, SET	H1	Harmonics U in %, actual	0=THD, 1=fundamental, 2...31=harmonical index	
	2	▼	H2	Harmonics I in %, actual	0=THD, 1=fundamental, 2...31=harmonical index	
	3	▼	H3	Harmonics U in %, Max.	0=THD, 1=fundamental, 2...31=harmonical index	
	4	▼	H4	Harmonics I in %, Max.	0=THD, 1=fundamental, 2...31=harmonical index	
	5	▼	H5	Harmonics U, 1/4h avarage	0=THD, 1=fundamental, 2...31=harmonical index	
	6	▼	H6	Harmonics I, 1/4h avarage	0=THD, 1=fundamental, 2...31=harmonical index	
	7	▼	H7	Harmonics U in %, 1/4h Max	0=THD, 1=fundamental, 2...31=harmonical index	
	8	▼	H8	Harmonics I in %, 1/4h Max.	0=THD, 1=fundamental, 2...31=harmonical index	
		▼		round robin --> 0		
	"S"		Series / Line	Steps Item Series	► Column Selection: Step Number 1..8 round robin	
	0		LED Info blinks	"S" Series Step Info		"S___"
	1	▼, SET	S1	Derating / Power Loss in %	per step 1..8; the red Steps LED of the selected step fastly flashes	
	2	▼	S2	Step Power, latest value	per step 1..8; the red Steps LED of the selected step fastly flashes	
	3	▼	S3	Step Power, initial in kvar	per step 1..8; the red Steps LED of the selected step fastly flashes	
	4	▼	S4	Detuning Factor in %	per step 1..8; the red Steps LED of the selected step fastly flashes	
	5	▼	S5	Duty Period in 100h	per step 1..8; the red Steps LED of the selected step fastly flashes	
	6	▼	S6	Switching Cycles in 100	per step 1..8; the red Steps LED of the selected step fastly flashes	
		▼		round robin --> 0		
	"A"		Series / Line	Alarm Count Series	► Column Selection: Alarm Type 1..60 round robin	
	0		LED Info blinks	"A" Series Alarm Info		"A___"
	1	▼, SET	A1	Alarms counted per alarm type (see below) since last reset (menu item "C0.13")		
	2	▼	A2	Alarms counted per alarm type (see below) that had been occurred ever (not resetable)		
		▼		round robin --> 0		

Menu Tree Set

	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
	0		LED Service / Set lights	Set menu, menu cursor resides at LED Service/Set	select Set menu series by ►	"Set_"
	1	►, SET	LED Service / Set blinks	"C0" Series Set Basic	series selection	"C0__"
	2	►	LED Set blinks	"In" Series Installation	series selection	"In__"
	3	►	LED Set blinks	"S" Series Step Settings; (Type, Power, duty, cycles, etc.)	series selection	"S___"
	4	►	LED Set blinks	"P" Series Parameter; (Alarm, Binary, Parameter etc.)	series selection	"P___"
		►		round robin --> 0		

Set Series Basic "C0" (=identical in the BASIC Controller)   **start action by SET**

	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
	0		LED Set blinks	"C0" Series Set Basic		"C0__"
	1	▼, SET	C0._1	change parameter current transducer ratio (ctr)		LED Auto / I blinks
	2	▼	C0._2	change parameter target cos phi (tariff 1)		LED Auto / cos phi blinks
	3	▼	C0._3	change parameter alarm cos phi, towards inductive (tariff 1)		LED Alarm / cos phi blinks
	4	▼	C0._4	change parameter alarm delay for cos phi alarms in hours		LED Alarm / cos phi blinks
	5	▼	C0._5	change parameter response time regulation for contactor switched steps in seconds		
	6	▼	C0._6	change parameter idle time for contactor switched steps in seconds		
	7	▼	C0._7	change binary param. suppress defect analysis, on/off		"_OFF"= defect analysis active
	8	▼	C0._8	restore display of acknowledged, still active alarms		"AL..." indicates those alarms
	9	▼	C0._9	change service password	0000=no password protection	
	10	▼	C0.10	hold fan for 30 minutes		
	11	▼	C0.11	reset min/max values of measurement matrix "Mx.yy"		
	12	▼	C0.12	reset min/max values of harmonics matrix "Hx.yy"		
	13	▼	C0.13	reset actual alarm count of menu series "A1.yy"		
	14	▼	C0.14	acknowledge "maintenance done"		
	15	▼	C0.15	fan test (toggle on/off)		
	16	▼	C0.16	alarm relay test (toggle on/off)		
	17	▼	C0.17	repair / check step size (side effects: re-activate defective step / start defect analysis whatever is appropriate)		
	18	▼	C0.18	repair / step replaced or added with automatic step sizing		not in commissioning mode
	19	▼	C0.19	repair / step replaced or added with step size input by hand		not in commissioning mode
				this item displays the smallest and biggest step sizes that can be entered before action start with no step selected		
	20	▼	C0.20	repair / re-activate defective step without checks	item visible only with special password	
		▼		round robin --> 0		

01.01	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
			During Normal Operation: **Set-Series Installation "In"** (=identical in the BASIC Controller)			**start action by SET**
	0		LED Set blinks	"In" Series Installation		"In__"
	1a	▼,SET	In._1	revert to **Standard Parameters**, parameter set I. No re-comm.		normal operation modes, only
	2a	▼	In._2	change from Normal Operation mode to Re-Commissioning		normal operation modes, only
				round robin --> 0		
			During Commissioning only: **Set-Series Installation "In"** (=identical in the BASIC Controller)			**start action by SET**
	0		LED Set blinkt	"In" Series Installation		"In__"
	1b	▼,SET	In._1	revert to the **(customer specific) Factory Defaukts**, Re-Commissioning required thereafter		commissioning mode, only
	2b	▼	In._2	Auto.Commissioning via Auto-Start		commissioning mode, only
			downwards from here: **Experts Menu** of Commissioning mode			
	3	▼	In._3	pre-programming controller in SE mode, on/off		=experts menu of commiss.
	4	▼	In._4	enter current transducer by primary and secondary current in A		=experts menu of commiss.
	5	▼	In._5	change current transducer ratio (ctr)		=experts menu of commiss.
	6	▼	In._6	limit number of populated steps (also called "end-stop")		=experts menu of commiss.
	7	▼	In._7	select steps types	► per step (e.g. fixed step)	=experts menu of commiss.
	8	▼	In._8	auto-gauge net configuration (phase angle, U/f nominal)		=experts menu of commiss.
	9	▼	In._9	enter net configuration by input signals: "2311"=L2-L3;L1,k-l		=experts menu of commiss.
	10	▼	In.10	enter net configuration: phase angle [0°, 30°, .. 360°]		=experts menu of commiss.
	11	▼	In.11	enter net configuration: nominal mains voltage in V		=experts menu of commiss.
	12	▼	In.12	enter fixed compensation power / base load in kvar (also SE m.)		=experts menu of commiss.
	13	▼	In.13	enter steps powers	► per step (also SE mode) [kvar]	=experts menu of commiss.
	14	▼	In.14	auto-size steps powers (also SE mode after In.13)		=experts menu of commiss.
	15	▼	In.15	change from commissioning mode into Auto. Regulation mode		=experts menu of commiss.
	16	▼	In.16	change service password	0000=no password protection	=experts menu of commiss.
	17	▼	In.17	change binary parameter show result on/off (std=on)		=experts menu of commiss.
	18	▼	In.18	change binary parameter detailed info on/off (std=off)		=experts menu of commiss.
	21	▼	In.19	execute power-less output test (wiring test)		=experts menu of commiss.
	22	▼	In.20	save current settings as customer specific Standard Parameters		=experts menu of commiss.
	23	▼	In.21	revert settings to the SE-Factory Defaults, then re-commission!		=experts menu of commiss.
		▼		round robin --> 0		

Error Codes on Abort of Auto-Commissioning						"Err.7" e.g. error no. 7
		1=abort by user (ESC key), 2=auto-gauge/enter net configuration before, 3=enter/auto-size steps sizes before (2,3					
		after In.15), 4=ALL steps unpopulated (=result of auto-gauging/sizing), 5=SE Mode not solved, 6=catenation preset					
		does not match the system, 7,8=timeout on auto-gauging/auto-sizing, 9=SE Mode presets do not match the system					

Set Series "S": "St", "S0", "SP", "Sd", "Sc" (▼,► Matrix)

"S"			Series / Line	Setting Series	► **Column Selection:** Step Number 1..8 (,0) round robin	
	0		LED Set blinks	"S" Series Steps settings	column= step number 1..8 or 0	"S__"
	1	▼,SET	St	Steps Types (OFF, AUTO CAP/IND, ON CAP/IND (=fixed step); std=AUTO CAP. Start selection by SET, select type using ▼ and accept selection by SET or cancel input with ESC. Commissioning mode: select any step type; normal operation mode: toggle betweenselected step type and OFF.		
	2	▼	S0	Initial Step Power in kvar. Note that SE mode internally uses a different scale with respect to standard size.		
	3	▼	SP	Detuning Factor in %. Take care, not to have different values if not desired because any combi detuning is active.		
	4	▼	Sd	Duty Period in 100h. This menu item may only be used to reset the value accumulated during normal operation.		
	5	▼	Sc	Switching Cycles in 100. This menu item may only be used to reset the value accumulated during normal operation.		
		▼		round robin --> 0		
			Commissioning mode: use column 0="___.All" to enter the same value for all steps. "S0" default value is 50kvar.			
			The red Steps LED of the selected step number/column fastly flashes (=Steps Cursor), all red Steps LEDs for column 0="ALL"			

Set Series "P": "PA", "Pb", "P0", "PI", "PC" (no Matrix usage)

"P"			Series / Line	Setting Series	► **Column Selection**: 1..n round robin	
	0		LED Set blinks	"P" Series Parameter		"P__"
	1	▼,SET	PA	External Alarm signal at ...	for colums see separate table below	
	2	▼	Pb	Binary Parameter (on/off)	for colums see separate table below	
	3	▼	P0	Common Parameter	for colums see separate table below	
	4	▼	PI	Configure Control Input	for colums see separate table below	
	5	▼	PC	Configure Communications	for colums see separate table below	
		▼		round robin --> 0		

		Show all "Set" menu items in ervery mode but input is restricted to commissioning mode in most cases.				
		Commissioning mode: some menus have additional series or columns if the SE password is active.				

01.01	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input	
						Variant	Operat. Mode; Pwd.
			Series "PA": External Alarms via alarm relay				
	1	►	PA._1	cos phi to inductive	alarm forwarded by relay on/off. Std=on	all variants	
	2	►	PA._2	cos phi to capacitive	alarm forwarded by relay on/off. Std=on	all variants	
	3	►	PA._3	step defective, power loss	alarm forwarded by relay on/off. Std=on	all variants	
	4	►	PA._4	duty period exceeded	alarm forwarded by relay on/off. Std=on	all variants	
	5	►	PA._5	switching cycles exceeded	alarm forwarded by relay on/off. Std=on	all variants	
	6	►	PA._6	voltage U rms < U min	alarm forwarded by relay on/off. Std=on	all variants	
	7	►	PA._7	voltage U rms > U max	alarm forwarded by relay on/off. Std=on	all variants	
	8	►	PA._8	U rms < metering range	alarm forwarded by relay on/off. Std=on	all variants	
	9	►	PA._9	U rms > metering range	alarm forwarded by relay on/off. Std=on	all variants	
	10	►	PA.10	I rms > metering range	alarm forwarded by relay on/off. Std=on	all variants	
	11	►	PA.11	Harmonics alarm	alarm forwarded by relay on/off. Std=on	all variants	
	12	►	PA.12	Frequency alarm	alarm forwarded by relay on/off. Std=on	all variants	
	13	►	PA.13	Excess temperature	alarm forwarded by relay on/off. Std=on	all variants	
	14	►	PA.14	internal HW error, e.g. low microprocessor voltage	alarm forwarded by relay on/off. Std=on	all variants	
	15	►	PA.15	Restart executed, e.g. after SW error, also at Reset by Hand	alarm forwarded by relay on/off. Std=on	all variants	
		►		round robin --> 1			

						Variant	Operat. Mode; Pwd.
			Series "Pb": Binary Parameters, e.g. on/off				
	1	►	Pb._1	none-capacitive regulation	avoids cap. cos phi at low P power	all variants	
	2	►	Pb._2	suppress defect analysis	attention! Off=defect analysis on	all variants	
	3	►	Pb._3	suppr. thyristor fast mode	attention! Off=thyr. fast mode on	variants 4T4K and 8T only	
	4	►	Pb._4	detail info on/off ("In.18")	shows every single commiss.result	all var.	commiss. mode only
	5	►	Pb._5	commissioning: suppress gauging/sizing results display		all var.	commiss. mode only
	6	►	Pb._6	contactors switch all together instead of subsequently		all var.	commiss. mode only
	7	►	Pb._7	contactors switch on despite U rms < Umin in the range from zero voltage (75%) to Umin (std: 88%)		all var.	commiss. mode only
	8	►	Pb._8	fan always blows if at least one thyristor is on because of the thermal dissipation by thyristor switches		variants 4T4K and 8T only	
	9	►	Pb._9	mixed detuning: combi detuning instead of absorption circuit controls the order of step usage according to the individual detuning factors		all variants	
????	10	►	Pb.10 yet not mplemented	low load cos phi alarms (alarms also at net conditions not controller caused)		all variants	
		►		round robin --> 1			

						Variant	Operat. Mode; Pwd.
			Series "P0": Common Parameters				
	1	►	P0._1	Current Transducer Ratio (ctr)		all variants	
	2	►	P0._2	Response Time for contactor switched steps in seconds		variants 8K and 4T4K only	
	3	►	P0._3	Idle Time for contactor switched steps in seconds		variants 8K and 4T4K only	
	4	►	P0._4	Target cos phi (, tariff 1)		all variants	
	5	►	P0._5	Alarm Threshold cos phi towards inductive (, tariff 1)		all variants	
	6	►	P0._6	Alarm Threshold cos phi towards capacitive (, tariff 1)		all variants	
	7	►	P0._7	Alarm Delay for cos phi alarms in minutes		all variants	
	8	►	P0._8	Fixed Compensation Power / Base Load in kvar (also inductive)		all variants	
	9	►	P0._9	Alarm Threshold THDU in %		all variants	
	10	►	P0.10	Alarm Threshold Single Harmonics in %		all variants	
	11	►	P0.11	Alarm Delay Harmonics in minutes		all variants	
	12	►	P0.12	Alarm Threshold Umax in % to Umains		all variants	
	13	►	P0.13	Alarm Threshold Umin in % to Umains		all variants	
	14	►	P0.14	Alarm Delay Long / inrush surge current dead time in seconds		all variants	
	15	►	P0.15	Alarm Threshold Power Loss in %		all variants	
	16	►	P0.16	Alarm Treshold Switching Cycles on/off in 100 occurrences		all variants	
	17	►	P0.17	Alarm Threshold Duty Period in 100 hours		all variants	
	18	►	P0.18	Temperature Offset in celsius degrees (Tcabinet - Tcontroller)		all variants	
	19	►	P0.19	Fan Activation Temperature in celsius degrees		all variants	
	20	►	P0.20	Shut-down Excess Temperature in celsius degrees		all variants	
	21	►	P0.21	Alarm Delay Excess Temperature in minutes		all variants	
	22	►	P0.22	Limitation of steps powers switching alltogether in % of largest step		all variants	
	23	►	P0.23	Response Time for thyristor switched steps in milli-seconds		variants 4T4K and 8T only	
	24	►	P0.24	Idle Time for thyristor switched steps in seconds		variants 4T4K and 8T only	
	25	►	P0.25	Response Time for contactor switched follow-up steps in seconds		variant 4T4K only	
	26	►	P0.26	Phase Angle Correction for summing Transducers, voltage transducers, etc. in angle minutes in range +- 15 angle degrees		all var.	commiss. mode only

01.01	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
	27	▶	P0.27	Output/Wiring Test: cycle count 1 ... 2000, std.=5		all variants
	28	▶	P0.28	Output/Wiring Test: cycle period 1s ... 60s, std.=2s		all variants
	29	▶	P0.29	Current Transducer Overload: preset in A / reset automatic=0A		all var. commiss. mode only
	30	▶	P0.30	Fixed Operation Frequency in Hz (!! be careful, harmonics may rise !!)		all var. commiss. mode only
				Interface Parameters of Control Input / tarriff select and Communications I/f in menu series PI and PC		
		▶		round robin --> 1		

			Preceding parameters are skipped if not relevant for the actual controller variant.
			No input to parameters outside the matching operation mode and without the required password.

Series "PI": Control-Interface Parameters: tariff entry, etc.   **Variant   Operat. Mode; Pwd.**

	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
	1	▶	PI._1	Configure the Control Interface (hardware and software usage)		all variants
	2	▶	PI._2	Configure CI digital modes	This menu item is always accessible	"__4.1" = displays input current
						use SET due to start sub-menu
				Further menu offering depends on selection in "PI._1" ...		
	3	▶	PI._3	Regulation curve cos phi (P) according to VDE AR-4105:2007		use SET due to start sub-menu
	4	▶	PI._4	Regulation curve cos phi (CI-Signal), LEW-Type		use SET due to start sub-menu
	5	▶	PI._5	Regulation curve cos phi (CI-Signal), common		use SET due to start sub-menu
	6	▶	PI._6	Regulation curve cos phi (P), common		use SET due to start sub-menu
	7	▶	PI._7	Regulation curve cos phi (U), common without Hysteresis		use SET due to start sub-menu
	8	▶	PI._8	Regulation curve Q (CI-Signal), common		use SET due to start sub-menu
	9	▶	PI._9	Regulation curve Q (P), common		use SET due to start sub-menu
	10	▶	PI.10	Regulation curve Q (U), common without Hysteresis		use SET due to start sub-menu
		▶		round robin --> 1		

... "PI": Control Interface Types   **Variant   Operat. Mode; Pwd.**

	Item	Signal	Type (Hex)	Type	for digital: 04mA/230V AC= ...	Display / Input
	2					all var. displays input current
		digital	0x0000/0001	alternate tariff 1 / 2	tarif 2 / inversal	
		digital	0x0002/0003	dual feed (w. section switch)	section switch on / inversal	
		digital	0x0004/0005	temporarily hold-off regulation	regulation hold / inversal	
		digital	0x0006/0007	synchronize quarter of hour	quarter start=04mA begin / end	
		none	0x0080	internal tariff change	< 0,5A=tariff 2, >= 0,5A=tariff 1	
		analogue	0x0010..00F0	analogue 4 .. 20mA input	04mA=lowest, 20mA=largest control signal input value	

	Item		Typ (Hex)	Regulation Curve	for analogue: 04mA..20mA=lowest..highest control value	
	3	none	0x0500	regulation curve cos phi (P) according to VDE AR-4105:2007		
	4	analogue	0x0150	regulation curve cos phi (CI signal), LEW Type		
	5	analogue	0x0110	regulation curve cos phi (CI signal), common		
	6	none	0x0100	regulation curve cos phi (P), common		
	7	none	0x1000	regulation curve cos phi (U), common, without hysteresis		
	8	analogue	0x0220	regulation curve Q (CI signal), common		
	9	none	0x0200	regulation curve Q (P), common		
	10	none	0x2000	regulation curve Q (U), common, without hysteresis		

			Either of the (CI) or (P) curves may be combined with one of the (U) curves.
			All besides the (CI) curves may be combined with one digital CI interface type.

... Sub-Menus of PI

	Item		Display	Condition	Menu Action	Display / Input
	2		PI.21	all digital CI input types	target cos phi, tariff 2	
			PI.22	all digital CI input types	alarm cos phi threshold inductive side, tariff 2	
			PI.23	all digital CI input types	alarm cos phi threshold capacitive side, tariff 2	
			PI.24	all digital CI input types	current transducer, primary and secondary in A, no dual feed or inactive	
			PI.25	all digital CI input types	dual feed: current transducer, primary in A, section switched	
			PI.26	all digital CI input types	dual feed: phase angle correction, section switched (yet not in use)	
			PI.27	all digital CI input types	dual feed: gauge ctr at section switched	start action by SET
	5		PI.31	cos phi (CI signal)	target cos phi at 04mA	
			PI.32	cos phi (CI signal)	target cos phi at 20mA	
	4		PI.36	cos phi (CI signal), LEW	target cos phi at 04mA	
			PI.37	cos phi (CI signal), LEW	target cos phi at 20mA	
	6		PI.41	cos phi (P)	lower reference value: real power in kW	
			PI.42	cos phi (P)	lower reference value: cos phi	
			PI.43	cos phi (P)	upper reference value: real power in kW	
			PI.44	cos phi (P)	upper reference value: cos phi	
	3		PI.46	cos phi (P), AR-4105:2007	rated real power Ppeak in kW	
			PI.47	cos phi (P), AR-4105:2007	cos phi at Ppeak	

01.01	Item	Key	LED / Display	Menu Item	Menu Action	Display / Input
			PI.48	cos phi (P), AR-4105:2007	start of regulation curve, real power (please calculate from % value)	
	7		PI.51	cos phi (U) without hysteresis	lower reference value: voltage	
			PI.52	cos phi (U) without hysteresis	lower reference value: cos phi	
			PI.53	cos phi (U) without hysteresis	upper reference value: voltage	
			PI.54	cos phi (U) without hysteresis	upper reference value: cos phi	
	8		PI.61	Q (CI) signal	reactive power at 04mA in kvar	
			PI.62	Q (CI) signal	reactive power at 20mA in kvar	
	9		PI.71	Q (P)	lower reference value: real power in kW	
			PI.72	Q (P)	lower reference value: reactive power in kvar	
			PI.73	Q (P)	upper reference value: real power in kW	
			PI.74	Q (P)	upper reference value: reactive power in kvar	
	10		PI.81	Q (U)	lower reference value: voltage	
			PI.82	Q (U)	lower reference value: reactive power in kvar	
			PI.83	Q (U)	upper reference value: voltage	
			PI.84	Q (U)	upper reference value: reactive power in kvar	

Series "PC": Communication Interface (RS485 interface, etc.)   **Variant   Operat. Mode; Pwd.**

		Key				
	1	►	PC._1	configure the communication iInterface (RS485 interface)	all variants	
		►		round robin --> 1		

... "PC": Pre-defined Communication Interface Types   **Variant   Operat. Mode; Pwd.**

	Signal	Type (Hex)	Type			
	485	0x2000	emulation of the CR2000M interface of controller CR2000, RS485 half-duplex, 9600:8,N,1	all variants		
	485	0x3117	cos phi big display using LCD module EA3117, RS485 transmission only, 9600:8,N,1			

Alarm Types 1..60

	Priority	Alarm Group =Alarm LED, () without Alarm LED	Alarm Reason	related to ... / notes	Code	Alarm Consequence
	Prio 1	cosphi	cosphi to inductive	alarm delay in range of hours !	"AL_1"	alarm note only
	Prio 0	cosphi	cosphi to capacitive	alarm delay in range of hours !	"AL_2"	alarm note only
	Prio 3	(SW)	defect analysis / step power supervision is inactive !!		"AL_3"	!! with side effects !!
	Prio 4	(SW)	maintenance interval expired, time to perform next check		"AL_4"	alarm note only
	Prio 2	THDU	(calculated) current through any step capacitor is to high		"AL_8"	with single step switch-off
	Prio 2	(TEMP)	advance warning on excess temperature		"AL_9"	alarm note only
	Prio 4	U	zero voltage (alarm count includes short term interruption w/o alarm)		"AL10"	with alarm switch-off
	Prio 2	U	U < Umin		"AL11"	with alarm switch-off
	Prio 3	U	U > Umax		"AL12"	with alarm switch-off
	Prio 0	U	U < metering range (ca. 50V)		"AL16"	with alarm switch-off
	Prio 1	U	U > metering range (ca. 780V)		"AL17"	with alarm switch-off
	Prio 0	I	I > metering range (ca. 7,7A)		"AL18"	with alarm switch-off
	Prio 0	THDU	harmonics threshold exceeded on any singe frequency		"AL20"	with alarm switch-off
	Prio 1	THDU	harmonics threshold exceeded on THDU		"AL21"	with alarm switch-off
	Prio 1	(TEMP)	excess mains fundamental frequency / freq. not measurable		"AL23"	with alarm switch-off
	Prio 0	(TEMP)	excess temperature	may escalate to shut-down ("StoP")	"AL24"	with alarm switch-off
	Prio 2	(SW)	low internal supply voltage		"AL25"	with alarm switch-off
	Prio 7	(TEMP)	**no alarm**, switch-off all steps on demand of CI control interface		"AL27"	with alarm switch-off
	Prio 1	(SW)	internal software error	triggers reset, alarm thereafter	"AL29"	displayed after reset with additional Information
	Prio 0	(SW)	pendular switch-offs/resets	triggers controller shut-down ("StoP"), alarm thereafter	"AL30"	displayed after reset controller shut-down
	Prio 7	Step	power loss ...	step 1 ...	"AL31" ...	
	Prio 0	Step	... exceeds threshold	step 8	"AL38"	with single step switch-off
	Prio 7	Step	duty period ...	step 1 ...	"AL41" ...	
	Prio 0	Step	... exceeds threshold	step 8	"AL48"	alarm note only
	Prio 7	Step	switching cycles on/off ...	step 1 ...	"AL51" ...	
	Prio 0	Step	... exceeds threshold	step 8	"AL58"	alarm note only
		additional alarm info	first alarm type within the last alarm cluster with switch-off		"AL60"	information note only

	For several alarms assigned to the same LED / group the numerical display only shows the highest priority alarm (=lowest Prio value) yet not acknowledged. Acknowledge that alarm using "SET"; then the next priority alarm cuts through. Use menu item "C0._8" due to restore already acknowledged but still active alarms (indicated by "AL...").