

UNIMA-KS

Development & production of control equipment
Visualization, measurement and regulation SW

WWW.UNIMA-KS.CZ unima-ks@unima-ks.cz

Ing. Z.Královský

Petr 457

675 22 STAREČ

Tel.: 568 870982

Fax: 568 870982

e-mail: kralovsky@unima-ks.cz

Ing. Petr Štol

Okrajová 1356

674 01 TŘEBÍČ

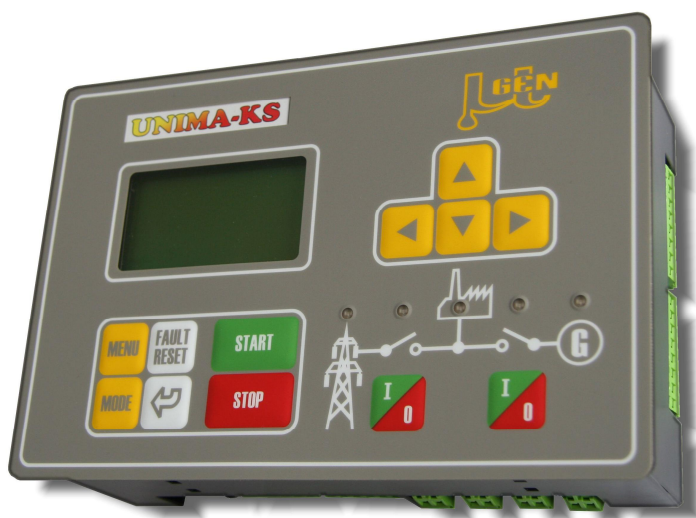
Tel.: 568 848179

Cell: 777 753753

e-mail: stol@unima-ks.cz

MicroGEN AP

User Manual



June 2014

1. Using	2
2. Actuating of the CU	3
2.1 Control panel	3
2.2 CU-Mode Selection.....	5
2.3 Description of the indicating LEDs.....	7
3. CU-Display map	8
3.1 "1/1 GENERATOR"	8
3.2 "1/2 GEN.(U,I,P,Q)"	8
3.3 "1/3 GEN.(Statistics)"	8
3.4 "1/4 GEN.(Alarms)"	8
3.5 "2/1 MAINS	9
3.6 "3/1 SYNCHRONIZATION"	9
3.7 "4/1 MSE (Cylinders)"	9
3.8 "5/1.. 5/8 User Defined Screens"	9

1. Using

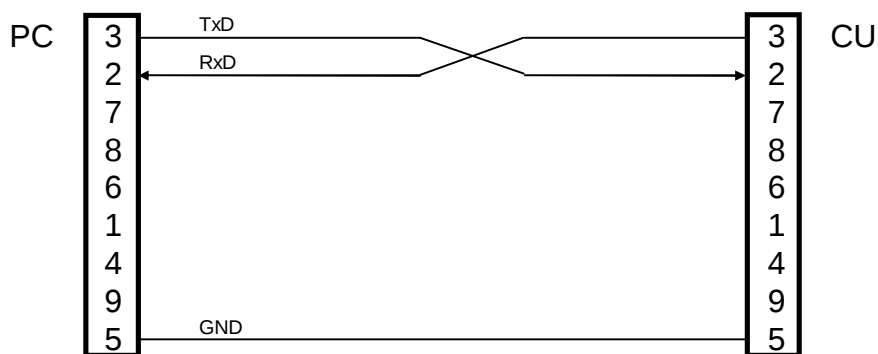
Control system (CU) is designed to control motor-generator sets with phasing generators to the distribution network, supports different modes of cooperation with the network contains network protection, generator and motor protections.

With user-defined functions (gates, flip-flops, analog members, PID controllers, control blocks for three-way valves, etc.) is possible the basic firmware easily extended with additional functionality (see documentation "ManagerAP a mapping function") ..

For technical specifications of the device (HW description, count and types of inputs and outputs, communication interfaces e.t.c.) see documentation "Specification MicroGEN AP HW VN".

Using RS-232 interface is possible to connect device to PC, control, visualize and configure it using program "ManagerAP". See documentation "Manager AP user manual".

For connection CU to PC use 3-wire cross-over cable (2-3, 3-2, 5-5, "nullmodem") with CANNON 9F.



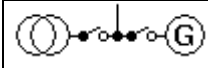
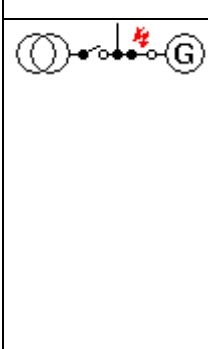
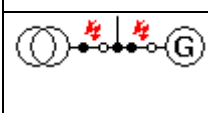
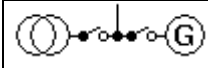
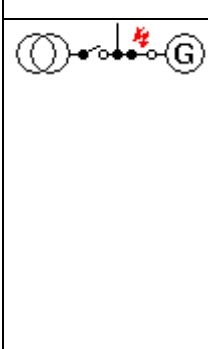
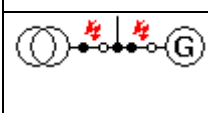
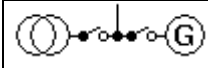
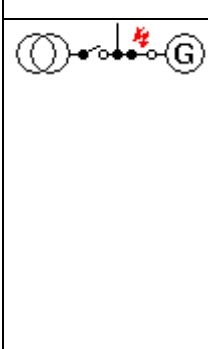
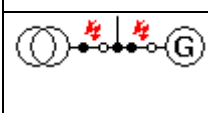
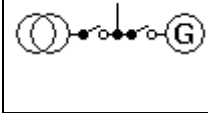
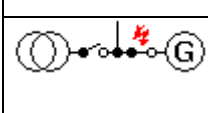
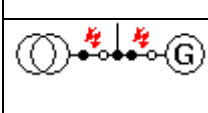
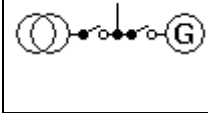
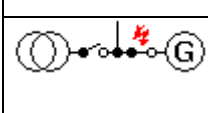
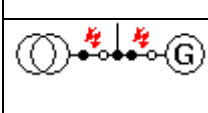
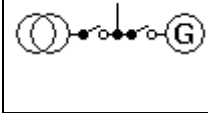
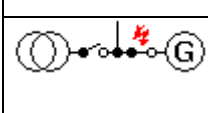
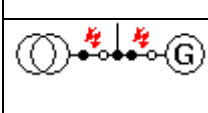
Using communication bus can be connected to control system expansion modules of inputs and outputs, speed controller USC, UIS voltage regulator, ignition UIS1÷4. All these components can be parameterized by one service program over a single connection to the control system. CU have these devices exchange the necessary information, so in addition to the communication bus is not necessary to further interconnection components.

2. Actuating of the CU

2.1 Control panel

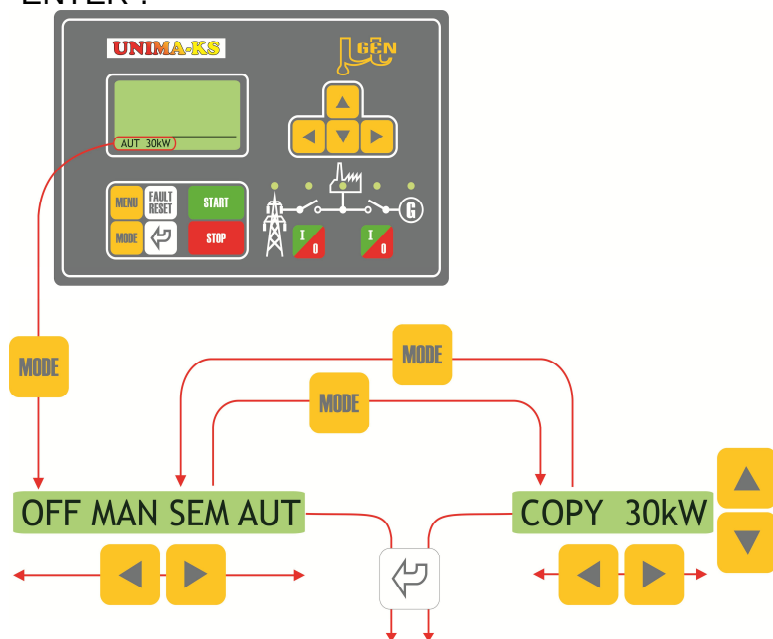
Control panel includes 12 control keys, graphic display 128x64 pixels and 5 two-colour LEDs for state indication.

	Selection of CU mode, control mode (OFF-MAN-SEM-AUT) and power mode (COPY – constant power)
	Input for menu CU
	Keys upwards and downwards, on the main screen are used to select displayed information, in menu serve for item selection.
	Keys left and right, On main screen they serve for switching of sub-screens. Press and hold of the right key enables to pass over to the list of alarms (1/4). Press and hold of the left key enables to pass over to the home screen of the generator (1/1).
	Key for fault deactivation after the fault source has gone off
	“Enter” Key Selection of desired airbrush in menu
	Start of the aggregate in manual or semi-automatic mode – activating the demand for aggregate run. Is there a start lock, the start is taking place immediately after the reason for blocking has gone off. In case there is a semi-automatic mode set, CU will either pass on to parallel operation (net deion is shows on-state) or pass on into operation under load (net deion shows off-state). If there is a manual mode actual, CU goes over immediately after start only to nominal speed operation mode. Keystroke during the relieving phase (i.e. the demand for successive unloading) causes the return to the parallel (island) operation.
	Initiation of shut-down and semi-automatic mode transition (provided this was actual in automatic mode). It activates releasing and after a time-out expiry desynchronizes (in parallel mode) or disengages generator contactor (in solitary mode) and after cooling evokes Stop. Keystroke during the relieving phase results in immediate contactor disengaging and cooling run transition. Keystroke during the cooling run results in immediate stopping of cooling run and unit halt.

 MCB (left)	Operating of net deion. Controlling of net deion is possible in manual mode only, and in only a few modes under net cooperation (E, P+I and P+E). In cooperation modes P and I is this key blocked, panel LED indicator of the net deion in P-mode is lighting constantly, in I-mode is not lighting constantly. In cooperation mode P+I can be selected by means of key whether the generator will be working in solitary or parallel operation (unless the deion-controlling is blocked through the parameter “MCBCrtlPI” from the CU-key board), automatic mode does not actuate the deion status. In E and P+E cooperation mode as well as in CU-automatic mode is the output governed according to CU-algorithm. <table border="1"> <tr> <td data-bbox="416 472 624 539"></td><td data-bbox="624 472 1418 539">Touch of button activates the deion-grids (irrespective the generator operation status).</td></tr> <tr> <td data-bbox="416 539 624 607"></td><td data-bbox="624 539 1418 607">Touch of button deactivates the deion-net (irrespective the generator operation status).</td></tr> <tr> <td data-bbox="416 607 624 954"></td><td data-bbox="624 607 1418 954">Touch of button activates backwards synchronizing towards the net and subsequently parallel operation with the net. The retouch during the backwards synchronizing towards the net will defeat the backwards synchronizing. Overrun of warning or emergency limits of some of the net or generator parameters (U, f, phase) will block deion contact making which can lead to malfunction of the “not in time synchronized”.</td></tr> <tr> <td data-bbox="416 954 624 1066"></td><td data-bbox="624 954 1418 1066">Touch of button deactivates the deion-net and causes generator transition from parallel to solitary operation (operation on-load).</td></tr> </table>		Touch of button activates the deion-grids (irrespective the generator operation status).		Touch of button deactivates the deion-net (irrespective the generator operation status).		Touch of button activates backwards synchronizing towards the net and subsequently parallel operation with the net. The retouch during the backwards synchronizing towards the net will defeat the backwards synchronizing. Overrun of warning or emergency limits of some of the net or generator parameters (U, f, phase) will block deion contact making which can lead to malfunction of the “not in time synchronized”.		Touch of button deactivates the deion-net and causes generator transition from parallel to solitary operation (operation on-load).
	Touch of button activates the deion-grids (irrespective the generator operation status).								
	Touch of button deactivates the deion-net (irrespective the generator operation status).								
	Touch of button activates backwards synchronizing towards the net and subsequently parallel operation with the net. The retouch during the backwards synchronizing towards the net will defeat the backwards synchronizing. Overrun of warning or emergency limits of some of the net or generator parameters (U, f, phase) will block deion contact making which can lead to malfunction of the “not in time synchronized”.								
	Touch of button deactivates the deion-net and causes generator transition from parallel to solitary operation (operation on-load).								
 GCB (right)	Operating of generator deion. It is possible to govern the deion in manual mode only (it is governed automatically according to CU-algorithm in the automatic mode). <table border="1"> <tr> <td data-bbox="416 1202 624 1314"></td><td data-bbox="624 1202 1418 1314">If the generator is running with nominal speed the touch of button causes attachment of load and passing on into operating on-load</td></tr> <tr> <td data-bbox="416 1314 624 1639"></td><td data-bbox="624 1314 1418 1639">If the generator is running with nominal speed the touch of button activates synchronization toward the net (provided emergency limits of net parameters are not exceeded). The re-touch during the synchronizing will annul the synchronizing. Overrun of warning or emergency limits of some of the net or generator parameters (U, f, phase) will block contact making for deion which can lead to malfunction of the “not in time synchronized”.</td></tr> <tr> <td data-bbox="416 1639 624 1751"></td><td data-bbox="624 1639 1418 1751">Touch of button will disconnect the load and courses transition from running on-load into unloaded run at nominal speed.</td></tr> <tr> <td data-bbox="416 1751 624 1863"></td><td data-bbox="624 1751 1418 1863">Touch of button causes generator desynchronizing and transition to parallel operation with unloaded run at nominal speed.</td></tr> </table>		If the generator is running with nominal speed the touch of button causes attachment of load and passing on into operating on-load		If the generator is running with nominal speed the touch of button activates synchronization toward the net (provided emergency limits of net parameters are not exceeded). The re-touch during the synchronizing will annul the synchronizing. Overrun of warning or emergency limits of some of the net or generator parameters (U, f, phase) will block contact making for deion which can lead to malfunction of the “not in time synchronized”.		Touch of button will disconnect the load and courses transition from running on-load into unloaded run at nominal speed.		Touch of button causes generator desynchronizing and transition to parallel operation with unloaded run at nominal speed.
	If the generator is running with nominal speed the touch of button causes attachment of load and passing on into operating on-load								
	If the generator is running with nominal speed the touch of button activates synchronization toward the net (provided emergency limits of net parameters are not exceeded). The re-touch during the synchronizing will annul the synchronizing. Overrun of warning or emergency limits of some of the net or generator parameters (U, f, phase) will block contact making for deion which can lead to malfunction of the “not in time synchronized”.								
	Touch of button will disconnect the load and courses transition from running on-load into unloaded run at nominal speed.								
	Touch of button causes generator desynchronizing and transition to parallel operation with unloaded run at nominal speed.								

2.2CU-Mode Selection

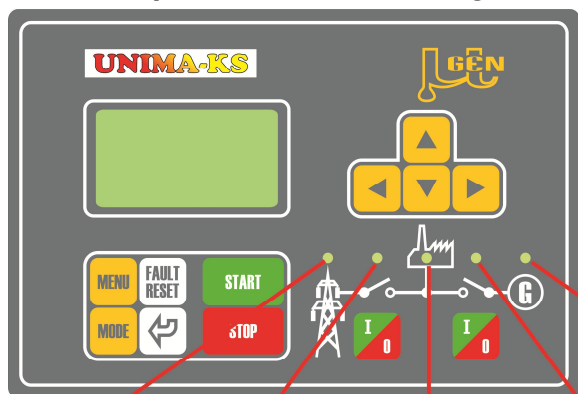
Selection of this mode is activated by key-stroke “MODE”. After having press this key for the first time it follows the flashing of the machine mode indicating arrows left and right and you can make your selection among “OFF-MAN-SEM-AUT” (meaning: set off - manual mode – semi-automatic mode – automatic mode). Another press of MODE-key causes flashing of the machine performance mode “30kW-COPY”, selection is made using the arrows left and right. Provided the fix performance is selected (no “COPY”), the desired performance can be set using the arrows up-and-down. For mode confirmation it is necessary to press the key “ENTER”.



CU-mode	OFF	CU is not active; signal “Ready” will not be released, even if there would be no blocking or malfunction. CU does not respond to any “START”-stroke (neither in manual nor in semi-automatic mode). There is the logic sign “ModeOFF” active.
	MAN	Manual Mode; CHP is starting however it is not passing on to synchronizing stage automatically. From CU key-board it is possible to operate manually GCB and MCB. Provided “COPY” mode is selected at the same time, the unit can be started irrespective the value of desired performance; if the desired level is low the CHP is running with the min. power (in parallel).
	SEM	Semi-automatic Mode; Start and Stop of the unit occurs using the keys START/STOP, nevertheless further it is running fully automatic, i.e. in the same way as in automatic mode. GCB and MCB operation from the CU key-board is locked.. Provided the “COPY” mode is selected at the same time and the net deion is switched ON the starting and stopping of the unit occurs in accordance with the power desired.
	AUT	Automatic Mode; The CHP is running fully automatic, based on Entry operational requirement (input logical signal HDO). Provided the “COPY” mode is selected at the same time and the net deion is switched ON the starting and stopping of the unit occurs in accordance with the power desired.
Power-mode	150k W	Constant power mode; the CHP is running based on the set-power (provided no power limited protection is active).
	COPY	Copy Mode; the CHP is imitating the entity consumption (i.e. the value of the power desired).

Key-stroke of STOP in automatic mode will cause the unit transition into the semi-automatic mode.

2.3 Description of the indicating LEDs

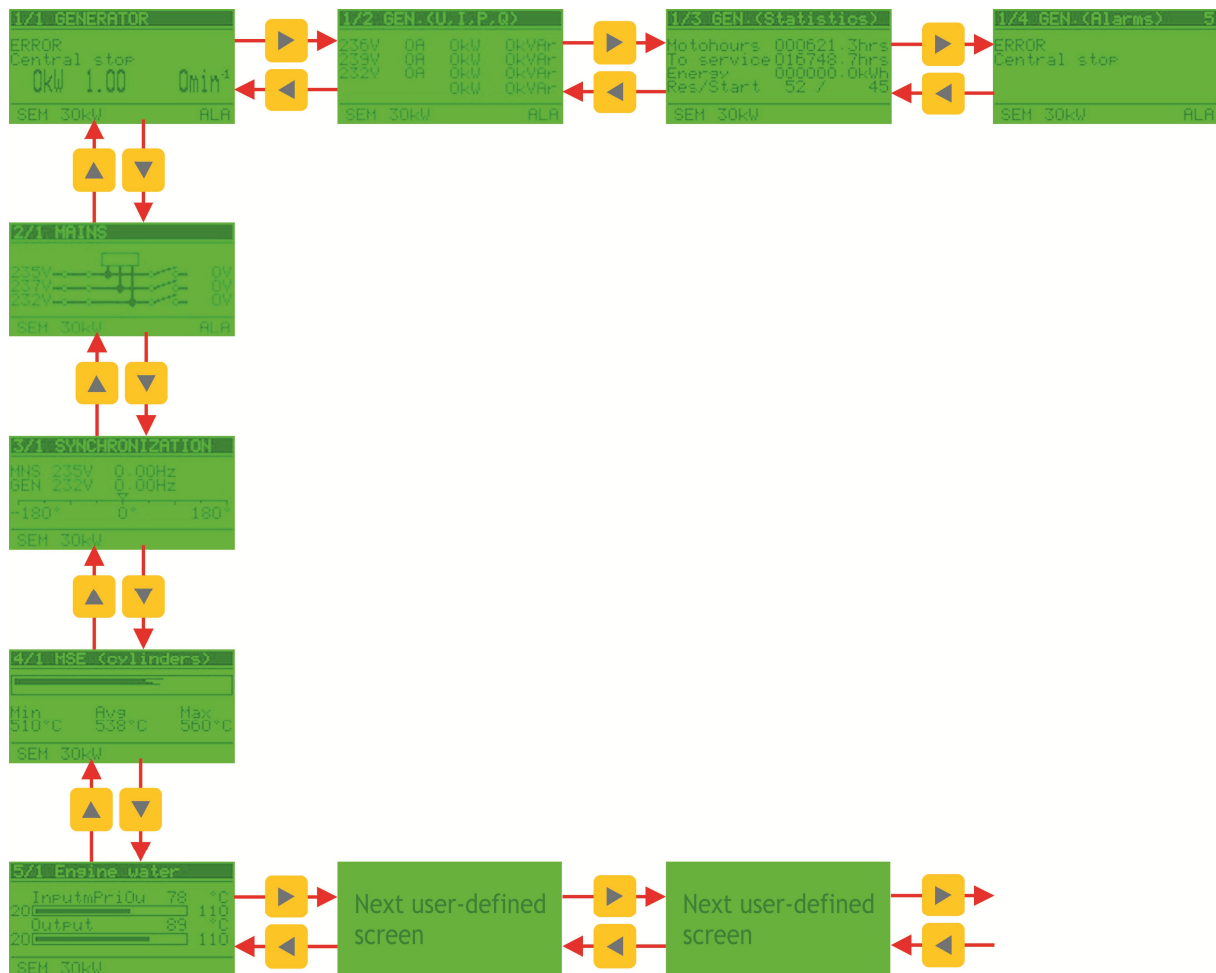


Net	MCB	Consumer	GCB	Generator	LED-colour
Net voltage is lower than 25V in all phases (measured by CU) and there are no external net protections active	Deion disconnected, back coupling OK	Neither MCB nor GCB are connected	Deion disconnected, back coupling OK	Generator voltage is lower than 25V in all phases	Not emitting
Net parameter OK	Deion connected, back coupling OK	There is connected either MCB or GCB	Deion connected, back coupling OK	Generator parameters OK	Green
-	Back synchronizing towards the net is running	-	Synchronizing towards the net is running	-	Green (blinking)
Warning net parameters have been exceeded	Feedback failure, deion disconnected (despite of requirement to connect)	-	Synchronizing towards the net is running	Warning generator parameters have been exceeded	Orange
Emergency net parameters have been exceeded (measured by CU) or there are external net protections active	Feedback failure, deion connected (despite of no requirement to connect)	-	Feedback failure, deion connected (despite of no requirement to connect)	Emergency generator parameters have been exceeded	Red

3. CU-Display map

Info in the CU-display can be switched over using cursor-keys or by selecting Menu/Display. The main CU-screens (Generator – Mains – Synchronizing – Measuring – User screens) are switched over by cursor-keys up-and-down. After that you can open a supplementary screen accordingly to the already selected main one (if exists).

Info referring to mode and alarms (flickering “ALA” on the bottom) are being indicated constantly, irrespective the above mentioned selection.



3.1 “1/1 GENERATOR”

On the display 1/1 there are basic information about genset state (Ready, Run, Error, e.t.c.), actual genset power, actual power factor, actual speed). Press and hold of the left key on any screen switch display to this screen.

3.2 “1/2 GEN.(U,I,P,Q)”

On the display 1/2 are measured values of generator voltage, current, active and reactive power in each phase, as well as total sum of powers.

3.3 “1/3 GEN.(Statistics)”

On screen 1/3 are statistics informations, total amount of running motohours, motohours remaining to service, produced energy and count of resets and starts.

3.4 “1/4 GEN.(Alarms)”

On screen 1/4 are cyclically printed records from alarmlist (all error or warning messages). The total count of records on alarmlist is printed in the top right corner. Press and hold of the right key on any screen switch display to this screen.

3.5 “2/1 MAINS

On screen 2/1 is displayed states if deion and mains contactors, generator and mains voltage.

3.6 “3/1 SYNCHRONIZATION”

On screen 3/1 is displayed information about synchronozation – mains and generator voltage in the first phase, mains and generator frequency and phase difference beetwen generator and mains phase.

3.7 “4/1 MSE (Cylinders)”

Screen 4/1 depend on firmware version.

In CHP version there are bar-graph with engine cylinders temperatures, minimum, maximum and average cylinder temperature.

3.8 “5/1.. 5/8 User Defined Screens”

Screens 5/1.. 5/8 are user configurable. Is possible to display there analog values with bar-graph or binary indicator usefull for customer. At one screen may be one or two analog indicators, maximal count of binary indicators depend on label text length.