Arc suppression coil regulator REG-DP(A)

Version information up to firmware V 2.9.02

GB

REG-DP(A)

Table of contents

1. General

1.1 Contents

This document contains information on the individual releases of the released firmware for the Petersen coil regulator REG-DP(A).

2.   Change Information

V2.9.02 from 16.10.2024

- General
  - Expansion of DPMess 5(6) by the value 'Iext' (external coils detected during search) and the parameterized target detuning (in % or A)
  - new system menu parameter 'IC, IL, IW monitoring' (default: active)
  - Adjustment of default values: dIC, dIL, dIW doubled to 10%, 10%, 40%
  - 'Potentiometer: Line resistance correction' function is integrated into the 'Calibration Assistant 2/2' menu (only with MCI)
  - Bug fix: when setting the SE feature to =2:HPCI and establishing a COM3 connection to the CCI, outdated values of the HPCI pulse parameters were sometimes sent to the CCI
  - Bugfix: % display coil position: previously with negative values the sign was in the wrong position in the text
  - Bug fix: although 'without potentiometer' was parameterized, the error message 'Coil position, line break: L-' came up.
  - Bug fix: delayed battery message in status can be masked again via statcheck
  - 'Soft time synchronization' for NTP time synchronisation built in analogous to REG-D

- Parallel operation without communication:
  - For the 'Parallel program' parameter, select 'M/S + without K.' added. I.e. the functions 'master/slave operation' and 'Parallel operation without communication' (=variable start delays) can be used simultaneously.
  - In parallel operation 'M/S & NoCom' only the 'MS' partial function is suppressed with the 'active' parameter (also SS clutch), the 'NoCom' partial function is still active. BOF49:ParaProg only shows the activity of the MS partial function in parallel operation 'M/S & NoCom'.
  - new parameters 'Min. Delay Search', 'Max. Delay Search' and 'Max. Delay Forced Search'.
    Note: previously the delays could only be set using a REG-L command

- Master/slave parallel operation with group list:
  - For the M/S parallel program alternatively to the standard behaviour (='1 slave'), the parallel operation can be parameterized with up to 4 participants (='group list'). The 'group list' is parameterized with the new parameters 'Participant 1..4'.
  - o new status page 8/8 to show group formation, master and slave role distribution and other details
  - BOF '22:Coupling' extended: becomes TRUE if at least two E-coils are coupled to each other (>= 1 coupling closed)
  - BOF '43:CouplSignal' expanded: becomes TRUE if at least two E-coils are reported as coupled
  - BOF '44:CouplViaNet' expanded: becomes TRUE if at least one external coupling was detected
  - new BIFs '67:Coupl_12' ... '76:Coupl_45' (DIF '67:Coupl_12' acts like BIF '29:Coupling')

- o The display 'Master' is no longer suppressed if the master can currently not move the slave(s) due to manual mode, blocked condition, etc.

V2.8.07 from 11.10.2022

- General:
  - o Detuning v integrated in the SCADA structure 'dpmess'
  - o The device menu is completely reworked for the languages CZ, RU and FIN
  - o Additional analogue output functions integrated

    - residual current Iw

    - detuning v

    - unbalance current Iu

    - in addition to Ipos also Icomp (+Ifix) and Icomp (+Ifix + Islave) integrated

- Current injection 'MCI' (feature CI=3):
  - o Support of new MCI firmware V1.1.03: P2-calibration without OR with additional external coil possible
  - o Bugfix: parameter transmission in relation with software limit switches

V2.8.05 from 09.06.2021

Note!	Compatibility of firmware versions!
	In case a REG-DP(A) firmware ≥ V2.8.05 is used together with current injection MCI, the MCI firmware has to be ≥ V1.1! The MCI firmware V1.0 can not be operated together with REG-DP(A) firmware ≥ V2.8.05. Regarding an update of MCI firmware please contact our head quarter.

- General:
  - o Names of list elements for feature CI changed to [0:no_CI, 1:CIF, 2:CI/HPCI, 3:MCI]
  - o For the display option 'Current axis = +Ifix':
    'Ipos+' is now displayed as formula character instead of 'Icomp' on all display pages
  - o A new search is started unconditionally when the controller falls into the trip delay for the nth time; see parameter 'Number of Search Delays'

- Current injection 'CIF' (feature CI=1):
  - o The Umin behaviour is aborted/terminated (and a new search is started) if the current injection can be used again (communication, blocking ...).
  - o Current injection algorithm 'UnsIci': the phase position is now also checked for plausibility outside the 'PolarityCheck' and, if necessary, error message 75:' Current Injection: Phase of measured values not plausible! Check polarity of measurement inputs!' is generated.

- o Bugfix: the CI binary input 2 has now, with feature CI=1 and a CI controller firmware >= V 3.0.00, the fixed (not changeable) function '-CI_Fuse'. Previously, the function was changeable in the REG-DP, but was still evaluated in the CI controller as '-CI_Fuse'.
- o Bugfix: In case of an offline parameterization of the inputs/outputs/LEDs and measurement inputs of the CI controller, the settings were sometimes lost when sending to the REG-DP. E.g. if a CI controller was never connected to the REG-DP before (COM3).

- Current injection 'CI/HPCI' (feature CI=2):
    - o Umin behavior is aborted/terminated (and a new search is started) if the current injection can be used again (communication, blocking ...).
    - o Current injection algorithm 'UnsIci': the phase position is now also checked for plausibility outside the 'PolarityCheck' and, if necessary, error message 75:' Current Injection: Phase of measured values not plausible! Check polarity of measurement inputs!' is generated.
    - o Bugfix: When parameterizing the inputs/outputs/LEDs and measurement inputs of the CI controller offline, the settings were sometimes lost when sending to the REG-DP. For example, if a CI controller was never connected to the REG-DP before (COM3).
    - o Bugfix: in case of earth fault in manual mode the pulsing of the HPCI could no longer be activated; the error existed from V2.7.20 onwards
    - o Bugfix: switching on manual HPCI pulsing via BIF 65:SE_mPulsOn was not suppressed if:
        - CCI reports blocked (because of e.g. U_LHW too small OR S1 dropped).
        - CCI switch in position 'Local'
    - o Bugfix: switching off manual HPCI pulsing via BIF 66:SE_mPulsOff was not suppressed if:
        - CCI switch in 'Local' position
        - The BEF 66:SE_mPulsOff switched off also a normal current injection
    - o Bugfix: the activation of the automatic HPCI pulse sequence via BIF 65:SE_aPulsOn (or also F2 key in the HPCI pulse screen) was not suppressed if:
        - CCI reports blocked (because of e.g. U_LHW too small OR S1 dropped).
        - CCI switch in position ' Local'
    - o Bugfix: the switching off of the automatic HPCI pulse sequence via BIF 66:SE_aPulsOff was not suppressed, if:
        - CCI switch in position 'Local '

- Current injection 'MCI' (feature CI=3):
    - o The Umin behaviour is aborted/terminated (and a new search is started) if the current injection can be reused (communication, blocking ...)
    - o the 'Mode 1' has been build-in (i.e. potentiometer, limit switch and up/down signals can be wired directly at the MCI); parameterizable with the new parameter 'Coil signals wired to MCI'
    - o the binary inputs and relays of the MCI can be used
    - o the MCI emergency positioning (in case of Modbus communication failure) can be activated with the new parameter 'MCI-Emergency-Positioning'
    - o feature PP_NO_COMM (parallel operation 'without communication') can now also be used together with the MCI

- o function 'check external coupling' in Master-Slave parallel operation can now be used together with the MCI
- o The default value of the parameter 'Abort tuning, if dIres >' is increased from 2% to 5%; the setting range is increased from [0.1 .. 9.9] to [0.1 .. 20.0].

- Comments related to 'MCI' (feature CI=3):
  - o When using a MCI, generally no further COM3 extension modules (ANA-D, BIN-D) can be used!
  - o The features CBR, EOR and ENEL cannot be used in parallel to the feature 'MCI' until further notice.
  - o The simulation of the regulation with coil and grid in combination with current injection (CI, HPCI and MCI) is still not supported.

V2.7.46 from 04.08.2020

Note!	Compatibility of firmware versions!
	In case a REG-DP(A) with firmware version V2.7.46 is operated together with a current injection MCI, the MCI firmware has to be V1.0! The firmware V2.7.46 is the first firmware supporting the current injection MCI.
	In case the MCI firmware is ≥ V1.1 a REG-DP(A) firmware ≥ V2.8.05 has to be used.

- First firmware support for the new multi-frequency current injection MCI. The following new menus/parameters have been added:
    o Feature SE (current injection) can be set under Setup/System 3
    o New calibration steps 'P2 calibration' and 'Zk calibration' added under Setup/Commissioning/P-Coils/Calibration wizard 2
    o New parameters 'Nominal neutral Point Voltage of P-coil' and 'Nominal Voltage of LHW' added under Setup/Commissioning/P-coils/Data of P-coil/Coil ratings
    o Measurement data of the MCI are displayed on the new page 8/8 in the status menu
- The following points are not (yet) supported by the firmware with regard to the use of the MIC:
    o Mode 1 (use binary IOs and potentiometer from MCI) is not yet supported
    o Binary IOs and LEDs of the MCI are not yet parameterizable
    o Feature PP_NO_COMM (parallel operation 'without communication') and feature CBR is not yet supported.
    o Feature EOR and ENEL not supported
    o When using the REG-DP with an MCI, no other COM3 expansion modules (ANA-D, BIN-D) can be used
    o Function 'check external coupling' not yet supported in MS parallel mode
    o The simulation of the control with coil and network (option - simulation) with current injection (CI, HPCI and MCI) not supported.
- Small values for 'Iext' (negative or also < 5A) are limited to =0A
- Permissible setting range of the parameters 'Coil position in the limit switches' and the % values in the linearization table extended from [0 .. 100 %] to [-1.0 .. 100.5 %]. Until now, values from [-0.5 ... 100.5 %] were accepted.
- In the event of an earth fault, the SE is now also aborted in MANUAL mode and switch-on is refused
- On the SE display page, HPCI also no longer displays measured values for Is and If (the lowest two lines); previously, only the formula characters were suppressed.

V2.6.11 from 20.05.2019

- RBAC extension 'Panel roles' Attention: the interface has been installed, but not the functionality in the REG-DP menu.
- the RBAC state is now indicated before time with a character: '^' = default role; '^^' = normal role is logged in.
- the RBAC blocking of the bootloader call with the commands SYSRESET = 0.1 / 0.2 / 0.9 was not yet present
- Role Based Access Control (RBAC) installed; analogous to REG-D

V2.6.05 from 23.07.2018

- Parameter 'HPCI pulse count': setting range extended from [1..999] to [1..9999]; default value changed from 15 to 10 to match the default value in the CCI

- new parameters (and Reg-L commands) to set the Une via REG-L:
  - o REG-L command 'espVoRegL' sets the value Une via REG-L. The command should be sent several times per second if Une changes significantly; and may have to be repeated cyclically (see Timeout) if Une does not change. On timeout: error message and selectable behavior.
  - o Parameter 'Une per REG-L active' (espVoSet): activates the functionality
  - o 'Une scaling' parameter (espVoSetSc): determines the scaling of espVoRegL: secondary or primary value.
  - o Parameter 'Une Timeout' (espVoSetTO): determines if and when a timeout error is triggered if the 'espVoRegL' do not arrive cyclically
  - o Parameter 'Une Hand bei Timeout' (espVoSet2H): determines the behavior at timeout: changes to HAND or blocks in AUTO if necessary.

- new parameters (and Reg-L commands) to set the coil position via RegL (extends the function of V 2.5.00)
  - o REG-L command 'espIposRegL' sets the coil position via REG-L. The command should be sent several times per second if the position changes significantly; and may have to be repeated cyclically (see timeout) if the position does not change. In case of timeout: error message and selectable behavior.
  - o Parameter 'Ipos per REG-L active' (espIposSet): activates the functionality
  - o Parameter 'Ipos scaling' (espIposSetSc): determines the scaling of espI-posRegL: as Ipos in [A] or Rproz (pot position) in [%].
  - o Parameter 'Ipos Timeout' (espIposSetTO): determines if and when a timeout error is triggered if the 'espVoRegL' do not arrive cyclically.
  - o Parameter 'Ipos Hand at timeout' (espIposSet2H): determines the behavior at timeout: changes to HAND or blocks in AUTO if necessary.

- The resistor control has prematurely aborted the last possible pulse before the over-temperature; the error existed as of 2.6.02.

- The REG-DP ran via Reset when asked via COM interface for the docu of espCIaPuls, es-pHPCIPTM or all esp* commands. The error was in the help file since V 2.5.00 (espCIa-Puls) or 2.6.00 (espHPCIPTM).

- The REG-DP has cyclically/endlessly signaled to the EOR-DM when the DP fell from Tuned to Trip Delay and thus cyclically triggered the PIL procedure at the DM, which in turn caused a cyclic 'external SE' in the DP. The error also caused the tripping delay to be re-started. Since the message to the DM is delayed by 10 s, the error only occurred when the tripping delay was parametered over 10 s. This means that the controller hung. I.e. the controller was stuck in the delay until a 'cyclic search' rescued it from the endless loop. The error occurred because after the 'ext.SE' the DP changed again from 'Tuned' to the state 'Trip delay'. (the error be-stand from 2.4.00)). From now on, the EOR-DM is informed only once and the tripping delay in the REG-DP continues to run during the 'ext.SE'.
  When switching off the 'external SE', the system now waits until the SE has switched off before leaving the SM. This avoids e.g. the short 'tripping delay' when returning to 'Tuned'.

V2.6.04 from 13.09.2017

- The logbook event 'EstimateResult' (intermediate results) is activated with FW updates to Versi-on >= 2.6.04

- New logbookEvents 'SuchVersuch', 'SE-Messwerte' and 'Uref' added. These events are all activated after FW update. For event 'SuchVersuch' the reason of the search repetition is coded in the additional data (see REG-DP_ReglerDoku.docx). For event 'Uref' also the REG-L command 'espDebugFlags' added to enter an event also at 'Uref retry'.

- In the HPCI pulse display the values 'Ires' and 'v' are replaced by '???' during the search process, respectively if the ground fault occurred during the search. Up to now the unit of 'Ires' and 'v' was changed to '?' as soon as the state 'Tuned' was left (also already at earth fault or hand).

- When starting the HPCI pulse sequence 'Detune - Pulse - Reposition' manually (F2 key in the pulse display), repositioning was not performed if the sequence had never been exe-cuted automatically before, or if pulsing had been performed automatically without (!) detuning because no valid search result was available.

- Parameter/function 'Latching' at Umin was not executed. Error existed from V2.4.00

- The behavior at the check 'external clutch' improved

- The logbook events 'Master', 'Debug', 'StatusError', 'I-coil', 'Slave' could not be sup-pressed by the corresponding parameters 'Event-Filter System

- From now on the SE frequencies for the 'external SE' are always reported to the EOR-DM

V2.6.03 from 20.04.2016

- bugfix: description (value range, default value, special case, if =0) of parameter 'Umin - New search after x min' (espSrchT) corrected/added in menu ('[1..1999]' => '[0 ... 1999] 0 = inactive'), in REG-L Onlinehife and in WinEDC.

V2.6.02 from 21.03.2016

- New HPCI: before pulsing at ground fault the coil is not positioned if a resonance curve search was running before the ground fault or the last resonance point 'Ires' was outside the adjustment range of the coil.
- New HPCI: pulsing at earth fault is aborted without retraction of the coil if feeders are switched which are monitored via the earth fault position correction mode (BIF 32..35:BEF_PosKorr1..4)
- The controller blocking deactivates the parallel control (both modes) from now on. I.e. blocking acts like switching off the PP by parameterization or BEF '29:Coupling'.
- R-control: the setting range of the parameter 'Temperature max' is limited from [0..999] to [50..999]. Previously, the FW had set the parameter to minimum = 41 on its own.
- HPCI: changed the default value of the parameter 'Detuning during pulsing' from +20A to +5A.
- HPCI: changed the default value of the parameter 'Cycles' from 10 to 15.

V2.6.01 from 03.02.2016

- Default value of the parameter 'Delay of search' changed from 10s to 120s.
- Bugfix: double 'AA' as unit for Imin, Ires and Imax in resonance curve display; the error occurred when the value needed exactly 4 digits (incl. decimal point); error always existed!

V 2.6.00 from 25.01.2016

- Finnish' language revised
- New BAFs: 89:CI_Status, 90:CI_SearchBlock, 91:CI_PulsBlock added
- NEW: power control for search with SE added: only for HPCI
- New: from V3.1.00 on the CCI delivers with the search results now also the actually used current (power control!) to the REG-DP.
- It is displayed with the SE measurement results in the SE display page (only with HPCI). The desired setpoint is still displayed before the first results.

V 2.5.05   14.07.2015

- Bugfix: with Umin behavior with MS parallel operation the slave was not positioned; the error existed as of version 2.4.00

V 2.5.02   21.04.2015

- - Finnish translation revised

V 2.5.00   03.11.2014 (HPCI)

- new: parameter 'HPCI pulsing with base current' (in system menu; REG-L: espHPCIlivez')

V 2.5.00 10.09.2014 (HPCI)

- HPCI is supported!
- New: Error messages 'The CCI firmware is too old! Update firmware!' appears if a CCI-FW < V2.2.01 is detected.
- New: Error messages 'Feature SE does not match the detected SE hardware' appears if (feature.SE == 1 && CI_type == 2004) || (feature.SE == 2 && CI_type == 2002)
- New BAFs '86:HPCI_Pulse', '87:HPCI_Local', '88:HPCI_Remote' added.
- New: automatic sequence 'detune - pulse - retract' added to continuous earth fault.
- New: only with feature SE=2: at continuous earth fault entry the controller automatically changes to the 'HPCI Pulse' display page; at earth fault end the controller changes back to the previous display page.
- bugfix: the BAF '48:SuchVerz' was not set if the trigger threshold was violated (also with Umin behavior); the error probably existed since V 2.4.00

V 2.4.08 12.08.2013

- New: in the 'dpmess 2' and 'dpmess 6' structures the flags 'daylight saving time' (bit 6) and 'autom. daylight saving time changeover' (bit 7) were implemented
- New: with the REG-L command 'espDebugFlag=0x200' makes the ambiguity of the kni of the measured value Ici inactive, i.e. also values > 1 are not multiplied reciprocally(for test tower; this flag is NOT reset at reset).
- Changed: from now on, as in versions before V 2.4.00, the system parameter 'Noise distance' (espEst4) can be used to set the threshold for the detection of the slope in a search with 'Move coil' stricter/looser.
- Bugfix: if a search was started immediately after a manual coil move, it could happen that the controller searched on the falling edge for the first time. The error probably existed from 2.4.00.
- Bugfix: Controller does not react any more (control task hangs up), if the search with SE is started by the parameter table
- 'Transmission behavior LHW' with factor=0 (where factor=0 is actually outside the entry range).
- Bugfix: with all 'fread° dpmess <nr>' commands it could happen that with very fast repeated queries (order of magnitude: within 1/10 s), was shifted several times around the UTC time zone.
- Bugfix: device crashes when searching for unknown command names in the online help; error existed since V 2.4.04

V 2.4.07 12.07.2012

- Bugfix: the scaling of the analog outputs channel 1..3 did not work; in addition, parameter changes during scaling sporadically did not have an effect (here all channels were affected); error existed since V 2.4.02
- Bugfix: the maximum coil runtime accepted during coil calibration was still 600 s instead of 999 s; from now on set to smooth 15 min; error existed since V 2.4.02.

V 2.4.06   23.05.2012

- Bugfix: the error messages 'Current Injection measured value U/I too small' (and the associated BAFs '29:Alarm', '30:Alarm_vz' and '36:FaultSum') were not acknowledged by earth fault, blocked and slave operation.
- Bugfix: In the first 10s after PowerUp, the error message 'Power supply not available' was not suppressed.

V 2.4.05   24.04.2012

- New: error message 'Slave not available'; comes/goes automatically; cannot be acknowledged.
- Remark: the other behavior is unchanged, i.e. it is only an alarm message with the BAFs '29:Alarm', '30:Alarm vz' and '36:Stör_Sum', i.e. the controller does not change into the state 'Error' but only deactivates the parallel operation as long as.
- New: REG-L commands 'espErrorMsg' and 'espAlarmMsg' to be able to generate own error messages e.g. in the H-program.
- New: from now on the error message 'Search unsuccessful! Une < Umax could not be reached' is generated if the search is aborted because the Umax threshold could not be undershot during searching or tuning.
- New: REG-L command 'espRposR'. Similar to 'espRpos', but the raw values BEFORE the plausibility filter.
- Changed: from now on basically all error messages are acknowledged at reset (as far as they can be acknowledged).
- Changed: in case of search abort, the search abort state will now be left consequently at any kind of acknowledgement and a new search will be started in general; acknowledgement by key and Reg-L in the search abort state has so far only deleted the error message.
- Changed: a reset now clears the error messages 'Number of search cycles exceeded' and 'Maximum motor run time exceeded'.
- Changed: the binary output function '13:BAF_Mot_Run' is now also excluded from the 'Minimum hold time relay', because it is derived from the excluded BAFs Motor_H and Motor_T.
- Changed: the REG-L commands 'espMotUpI' and 'espMotDownI' now return the error 'Argument range wrong' if assignment != 1 now
- The error 'Argument range wrong' instead of executing the command anyway.
- Changed: the error message 'Error in communication with EOR-DM' now comes/goes automatically and can no longer be acknowledged.
- Changed: the error 'Battery empty' can now be acknowledged and is only set again after a reset.
- Remark: with acknowledging the message also BAF '4:Status' and BAF '36:Stör_Sum' are deleted,
- However, BAF '58:Batt_leer' and the error display in the status menu remain until reset.
- Bugfix: directly after PowerUp, the detection of the gradient was faulty. This could lead to searching in the wrong direction or not leaving Umax. The error existed from 2.4.00.
- Bugfix: the error messages 'Firmware is not compatible to the device hardware' and 'Battery is empty' could not be acknowledged after reset. ; even if the error condition was no longer fulfilled.

- Bugfix: during a FW update from a version < 2.4.03 (or after a battery failure (=NVRAM deleted)) the list of active error messages was not initialized, i.e. arbitrary error messages were created. The error existed from V 2.4.03.
- Bugfix: the error message 'Slave: Uen measurement values not available (#: <No>)', if at 'check external coupling' the slave did not react (timeout), did not occur.
- Bugfix: if no power supply was available after reset, the alarm message 'Power supply not available' did not come reliably.
- Bugfix: at search abort due to 'too small current injection measured values' or if 'Umax threshold could not be kept' the BAFs '29:Alarm', '30:Alarm_vz' and '36:Stör_Sum' were not set. The error always existed.
- Bugfix: REG-L command 'espRposR' delivered the plausible raw values in version 2.4.05. Now finally BEFORE the plaus filter.

V 2.4.04   18.04.2012

- New: RegL commands 'SYSREStromeinspeiseT =0.1 / =0.2 /=0.3 / =0.9 (=599 / =599.1 without effect; like =590 /590.1) implemented
- Bugfix: after a master reset the UTC time zone was initialized to +0.25 h (or +1/4 h) instead of +1 h

V 2.4.02   22.02.2012

- New: REG-L commands 'espCPUver': Version of the CPU (1.1, 1.2 or 2.0) and 'espRAMsize': Size of the RAM memory (1 or 4 MB)
- New: REG-L command 'espAIscal <channel>' returns the rescaled value from analog input 1..6
- Changed: 'Battery is empty' is now an own error message (no. 28) and is no longer reported via
- 'Error 7: internal error #128'. Note: but, as before, the 'Device status' message is cleared when the battery is empty.
- Changed: the usual current supply input/output channels are offered in the menu even if no current supply was connected yet.
- Changed: If the power supply loses its operational readiness (e.g. due to communication failure, blockage, fuse) while the power supply is not active, there is no reaction at first, but only an alarm message is generated. Only at the start of the search (only if the current injection algo is parameterized) is the system waited for (60 s) and, if necessary, the 'Move coil emergency operation' is executed. I.e. a current supply failure is to-lered as far as possible, even if possibly signals (potentiometer feedback, binary inputs and outputs), which are directly connected to the current supply controller, are no longer updated.
- Changed: Condition for 'Battery empty': the error message is now only set when the battery voltage is below the threshold for 20 s, and is now only reset by a re-set. So far the message had 'fluttered' for days/weeks.
- Changed: the error message 'Device status! Internal error (#xy)' is now repeated with every change of the device status flags (with new no.).
- Changed: the maximum coil runtime accepted for coil calibration has been increased from 600 s to 999 s.

- Bugfix: the REG-L command 'espAIfv' accepted the indexes [1..7], although in the FW only the index 1(=PROG) is realized.

- Bugfix: If no Usync was connected during a search with the power supply algo 'UnsIci', the search was aborted after <SearchNumber> attempts, or the error message 'internal error #10' was displayed if the search was never performed with Usync after reset. The current supply algo 'UnsUodIsIf' reported without Usync 'measured value missing'. From now on, it is possible to search with both power supply algos without Usync.

- Bugfix: if the parameters of the LHW transmission table were changed via REG-L (espCoil-CompR, espCoilCompF), the calculation was wrong (the slopes for interpolation were not updated) until the device was reset or the table was saved again in the menu.

- Bugfix: when positioning in search abort, if Umax could not be left even at the limit switch, nevertheless another short attempt was made to leave Umax. Now the controller stops immediately in this hopeless case.

- Bugfix: at search with current supply, if Umax could not be left also at the limit switch, <SuchAnzahl> attempts were run through, instead of aborting the search immediately after the 1st attempt. Error existed since V2.4.00.

- Bugfix: at power feed communication failures, while the power feed was active, the communication did not catch again (but ran after 60s into the Er-rorState (=Hand)). The error probably existed from version 2.4.00.

- Bugfix: in case of error messages in the display (message window for 5s) now also the error number is shown if necessary. In addition, a header line 'Error:' has been added.

V 2.4.01   30.08.2011

- New: in addition to the existing potentiometer monitoring for 'loop break', now also for 'line break L-', and 'L+' is monitored. The behavior and the error messages are comparable to the 'wiper break'.

- Changed: Resolution of the parameter 'Time zone' (REG-L: UTCtz) increased from 1 h to 1/4 h. In the device is rounded to 15 min.

- Bugfix: the correction factors 'transmission behavior LHW' was used reciprocal for the measured value 'I-ci', but only if the parameter kni_Ici < 1 was parameterized. Error occurred with the change in 2.4.00.

- Bugfix: with parameter setting 'Options - Current display' = '+Ifix' OR '+Ifix+Islave':

- The reaction to changes in the feedback state of the fixed coil (with parameter change 'Feedback fixed coil' or per BEF '30:Fixed coil' or per Reg-L 'espIfixOn') was delayed, and in manual mode not at all.

- The fixed coil was also generally not added if the parameter 'Use fixed coil value = measured value' was parameterized; now the fixed coil value is always added as soon as the fixed coil is reported as switched on. Exception is only the case ' current injection search algorithm=UnsUodIsIf' with 'Use fixed coil value = measured value'; here, and only after the search, the corresponding measured value If is considered instead. The error existed in this form from the changes in V2.3.19.

V 2.4.00   19.05.2011

- New: if the same network is detected again during a search with current injection, during a cyclic search.

- And the Une in the target tuning position would probably exceed the Umax threshold -> is not retuned. (Behavior analogous to Umax_end; compare change in V 2.3.28)

- New: parameter 'Avoid resonance maximum' (espVresAvoid). If activated (=1:YES), then at search algo 'CoilMove' with extended path (minimum search path + 'Umax minimum path extension')is searched in direction of the falling edge. Then the search is reversed and the search is repeated on the rising edge and then tuned. The behavior is similar to the behavior when the 'Umax' threshold is exceeded at the start of the search.

- New: 'Tuned U' (or 'Tuned U x.xmin').

- New: BAF 84:Abg_Umax_end; E-coil is 'tuned' OR positioned at Umax_end (=BAF14 || BAF55; request RWE).

- New: the utilization of the trigger threshold is displayed as a bar graph in the resonance curve display. Display in 0..128% of the limit value. With small marking at 100% and at the hysteresis lower limit (as long as the trip delay is active).

- However, the display only appears in the states in which the trip threshold is also monitored; i.e. in 'Tuning' and in 'Tuned'.

- New: BAF '85:Abg_v_invers'. E-coil is tuned_not_compensated and is on the wrong resonance curve flank.

- New: when searching with current injection, the state 'Tuned(nk)' now reacts to changes of the parameter 'cycl. excitation all' (switch off, switch on, shorten). Up to now the timer was set at the transition to 'Tuned(nk)' and could then no longer be influenced.

- New: in the status menu 1/6 the (currently unused) SysAC number is now also displayed under the serial number.

- New: 'Earth fault threshold effective value' (espEFrms) determines whether the effective value (Une_eff) is used for the Uerd and Umax thresholds instead of the usual value Une (only 50Hz component). Default: 0:NO (only 50Hz).

- Remarks: as of 2.3.26 the effective value was always used - before always the usual value Une (only 50Hz part). Only for heating up the resistor in the R-control the RMS value is still basically used.

- Changed: Parameter 'Fixed coil active' renamed to 'Fixed coil feedback' (espIfixState).

- Changed: Parameter 'Fixed coil control' renamed to 'Fixed coil control' (espIfi-xActiv)

- Changed: if no estimation result is achieved between the Umax limit and the limit switch (because minimum travel is not possible) the search is aborted immediately. Up to now the complete search number was tried.

- Changed: the old algorithm for checking the calculated resonance curve during tuning has now been removed. Thus the parameter 'Check net parameter' (espChkNetPar) is no longer used. If the new parameter 'Check resonance curve over' (espChkNetPa2)=0 is set, no check is now performed instead of the old algo.

- Changed: for 2-point results, there is now generally no check of the calculated resonance curve during tuning (parameter 'Check resonance curve'). The check had worked insufficiently near resonance points.

- Changed: the parameter 'Umax_end Priority' (EspVmaxEndD) now also controls if the Umax is driven below the Umax_end limit in case of an Umax collision on the 'wrong flank' (target tuning is behind Ires); so far it only worked in case of collisions with the limit switches.

- Changed: BAF '16:Umax_nk' now also reports if Umax could no longer be left due to a limit switch. Attention: from V2.4.02 the search is aborted, so that the message does not come any more.

- New: from now on the controller recognizes if the Une suddenly rises again when leaving Umax (during search or tuning) (e.g. due to a switching action). The controller stops the coil and starts a new search.

- Changed: even if the search is aborted, the Umax threshold is now left by moving the coil in the direction of falling Une. If the Une suddenly rises again (switching action), the direction is changed (maximum three times).

- Changed: at search algo 'move coil' the search now starts in direction of the previous resonance point (except if 'avoid resonance maximum' is active or Umax is exceeded; in this case in opposite direction). If necessary, of course, away from the limit switch! The extended condition 'Start close to limit switch' has been removed. So far the start was in direction 'rest position'.

- Changed: If the threshold 'Umax' is exceeded at the start of the search, the gradient is nevertheless determined by briefly moving the coil and a search is carried out on the falling edge. After that, it is turned around and searched again on the rising edge and then tuned. Previously, the controller simply stopped with the message 'Search Stop: Une > Umax'.

- Changed: Parameter 'Une error threshold' (EspVoErrLim) (renamed, formerly: 'Limit value Une error').

- Changed: 'Une error hysteresis' parameter (EspVoErrLimH) (renamed, previously: 'Une_Overflow hysteresis').

- Changed: Parameter 'Umax Hysteresis' (EspVmaxHy)

- Changed: Parameter 'Umax_end Hysteresis' (EspVmaxEndHy)

- Changed: Parameter 'Umax_end Priority' (EspVmaxEndD) (renamed, formerly: 'Direction change at Umax_end ')

- Changed: in status menu 3/6 now the real potentiometer value is displayed; no longer the value after the plaus filter

- Changed: in state 'Tuned U' (if the tuning position was limited by Umax_end) a new search is started only by the usual trigger threshold. No more if only Umax_end is exceeded.

- - changed: StatusLineText
  - o Old: 'degraded not comp.'
  - o New: 'controlled not comp. (or 'controlled nk x.xmin'), or if the tuning position was limited by Umax_end.

- Changed: current injection display page (in controller menu) now also shows the measured values for the (only internally used) parameter set 'Measure' (cf. espCIactiv=5)

- Changed: the parameter 'cycl. excitation all' (EspCIdTSrch) is only used for the search by current injection. Up to now, cyclic triggering was also used for search with 'Move coil'. Which is not useful.

- Changed: in case of search abort, repositioning is no longer done after reaching the end position, if the target position changes due to parameter changes ('end position at abort' or 'rest position'). According to the general philosophy.

- Changed: Default assignment of the following binary input and measuring input functions of the current supply controller:

- Binary input 2: '62: current injection _Fuse' inverted! (compare V 2.3.31)

- - U1: '1:Usync', U2: '2:Uns_coil', U3: '3:Uod_net', I1: '1:Ici', I2: '2:Is', I3: '3:If'

- Changed: when checking an external coupling, in case of communication problems with the slave, the check is no longer switched to error state, but only aborted; previous error message is unchanged

- Changed: BAF '56:dIce_max' is no longer set in HAND mode; makes no sense, because in HAND network changes are not monitored.

- Changed: State 'Blocked' now gets a higher priority than the function at earth fault, so especially the positioning in the ES is suppressed when blocking is active.

- Code maintenance: StateMachine 'Regulation' (formerly SM_MAIN; now SM_TOP and subSMs) completely new; no significant effects.

- Bugfix: timeout during coil calibration (with potentiometer) never occurred in the 1st step (exit EU).

- Bugfix: now the full 20 characters of the serial number are displayed(Menu: Status 1/6) ; before only 19.

- Bugfix: with small, pointed resonance curves no valid angle 'UresPhi' is determined (min. 3 measured values must be > 0.3V).

- ('UresPhi' is then missing in the display; in the logbook appears ... 'UresPhi= -----°')

- Up to now, the invalid 'UresPhi' was nevertheless used for comparison during the transition to 'Tuned' in the 'End-check'. Thereupon the estimation was discarded and a new search was started.(-> endless search -> search abort). The error always existed.

- Bugfix: with SearchAlgo 'Move Coil' the reso-nance curve check was ineffective during tuning as long as the search direction was kept during tuning.

- Bugfix: when searching with 'Move coil' the minimum search distance was extended by x% of 100A instead of x% of Imax when leaving Umax; see hidden parameter 'Umax mini-mum distance extension' (EspVMaxExit)

- Bugfix: the parameter 'LHW grounded' (espCIgnded) was destroyed in the master by the 'check of an external coupling' (in the controller menu: '=???' instead of '=No', in Reg-L: '=1:Yes' instead of '=0:No'). The error existed from version 2.3.31, in which the parameter was introduced.

- Bugfix: the ugly behavior at cyclic search with current injection 'cyclic posing because of an active Umax_end condition', actually fixed since V2.3.28, was not measured cleanly at Une converter nominal voltages secondary not equal to 100 V.

- Bugfix: setting range for the correction factors in the parameter table 'Transfer behavior LHW' corrected (0.1..10 instead of 1..100)

- Bugfix: at a reset in the final state of the Umin behavior, i.e. 'Tuning Umin' and already BAF '9:Une<Umin' (delayed!) was set, the message BAF '9:Une<Umin' was only deleted again, when the next time 'Tuning Umin' was left. Now the message is deleted with the reset (fits, after after each reset is always searched again anyway).

- Bugfix: the 'check external coupling' could lead to wrong results, if in master or slave at the search with current injection with other frequency settings than 11+- and 13+- was searched. The error existed since V 2.2.10. At the same time the parameter 'Feed (LHW) grounded' was destroyed during the check in the master. This naturally removed the as-sociated protection function against 'forbidden' feed-in patterns with grounded E-coils. This error effect existed since V 2.3.31.

- Bugfix: with the parameter setting 'Options - Current display' = '+Ifix' OR '+Ifix+Islave': the reaction to changes in the feedback state of the fixed coil (with pa-rameter change 'Feedback fixed coil' or per BEF '30:Fixed coil' or per Reg-L 'e-spIfixOn') was delayed, and in manual mode not at all.

- The fixed coil was also generally not added if the parameter 'Use fixed coil value = meas-ured value' was parameterized; now the fixed coil value is always added as soon as the fixed coil is reported as switched on. Exception is only the case ' current injection search algorithm=UnsUodIsIf' with 'Use fixed coil value = measured value'; here, and only after the search, the corresponding measured value If is considered instead. The error existed in this form since the changes in V2.3.19.

V 2.3.35   24.02.2010

- Bugfix: With cyclic search with current injection, it could happen that the controller fell into the state 'Tuned_NK' instead of positioning with unchanged mains but bad positioning. The error existed since V 2.3.28.
- Bugfix: In EDCSys, systems with two REG-DPs there are sporadic errors in the processing of REG-L commands in active master-slave operation due to the reference formation in the EOR-DM (i.e. 'external current supply' requests) in the master. Both internal M/S communication via ELAN and communication via COM1 and COM2 (e.g. to WinEDC) are affected. Also the H-programs should be affected (could not be verified explicitly). This error condition is healed only with the next reset. The error existed since V 2.3.13.
  - o Typical error patterns are:
    - sporadic errors during parameter set readout
    - the logbook cannot be read out at all (error message with almost every record)
    - sporadic alarm messages 'Error during communication with EOR-DM (or 'Slave')' in Master or Slave
- Logbook entries: 'BAF 83: Slave missing' (or 'BAF 83: ') in master
- Bugfix: If in the state 'End position at search abort' an earth fault wiper occurred, which decayed a bit slower (i.e. temporarily: Uerd > Une > Umax) the REG-DP had moved the coil for a short time, until also Une < Umax was underrun.

V 2.3.34   25.11.2009

- New: in the status menu now also the CPU version and the RAM size in MB are displayed.
- Changed: if a ground fault wiper occurs during the search, the power supply is switched off immediately; no longer only after the wiper time.
- Changed: After a wiper during the search, a new search is still started, but from now on the number of attempts is also increased.
- Bugfix: an 'unchanged' grid (for cyclic search with current injection: see 2.3.28) is now also detected correctly if Ires < 0 (e.g. if oversized fixed coil in the grid).
- Bugfix: At the first PowerUp (after battery change), there could be a superfluous pixel somewhere in the abscissa line (x-axis) of the resonance curve display.
- Bugfix: Backlight of display never goes off. The error existed since V 2.3.34 04.08.2009

V 2.3.33   01.10.2008

- Changed: after switching the fixed coil, only the short 'Delay forced search' is waited for before a new search is started. Previously, the long tripping delay ('Search delay') was waited for.

- Changed: with manual current injection in manual mode, it is now possible to inject with only 50Hz (frequency 1 = 12) without the current injection being aborted with an error message ('Internal error #9').

- Changed: at the automatic phase correction in the current injection algo the step width when turning the 'Phase Usync' was reduced from 30° to 15° steps.

- Changed: the parameter 'Frequency 1' of the manual current injection has moved to the normal menu.

- Changed: Menu page 'Check measurement inputs for polarity': separate messages for '...finished successfully' or '...aborted'. And a new message '... perform at resonance point' at startup.

- Changed: the REG-L command 'espCIautoPhi' is only available with set feature current injection. Assignments only possible in manual mode.

- Changed:REG-L command 'espCIautoPhi' now returns error messages if Po-larityCheck is aborted without success.

- Bugfix: Online documentation of the Reg-L commands 'espCaTrafoL' and 'espCaTrafoR' was not available.

- Bugfix: Text at parameter 'SlaveSpule bewegen=fix.Pos.' in ENEL menu adapted to stand-ard menu (all languages).

- Bugfix: when checking resonance curves (during tuning), the parameter 'Check resonance curve' was often aborted and a new search started if the Une value was small or the value was large. The cause was an incorrect comparison of the Une phase position against the estimated resonance curve (error existed since 2.3.26).

- Bugfix: Fixed and slave coils were not switched/moved during search/tuning with current injection, if the coil was already in the limit switch at PowerUp (only after the first coil movement it worked again).

- Bugfix: Logbook: with 'external current supply' in state 'Abgest. nicht komp.' the BAF '15:Abg_nK' was occasionally set for 1 - 2 s =0..

V 2.3.32   01.09.2008

– Changed: the REG-L command 'espCIautoPhi' is now only available with set feature current injection and in manual mode.

– Changed: Menu page 'Check measuring inputs for polarity' revised: The check can now be started/stopped directly. The phase positions / polarity reversal states are now also displayed.

– Changed: at automatic phase correction at current injection with algo 'UnsUodIsIf': at 'Avoid too many polarity reversals' the polarity reversal of If was also turned, if no fixed coil was measured. Now If is consequently not touched if no fixed coil is measured (= if the measured Ifix < Imax/10).

V 2.3.31   06.08.2008

– New: the logbook events 'BA' and 'BE' now also record the pa-rametered 'Designation' (only in WinEDC). If no 'Designation' is parameterized for an input/output, the designation of the linked BAF or BEF is recorded.

– Remark: New logbooks can also be displayed with older WinEDC versions (incl. V 1.3.2.11), but the new designation is missing of course.

– New: BEF Power supply fuses fallen '62:Power supply_Fuse' with own new error message 'Power supply fuse fallen!'; The controller behaves as in the case 'Power supply blocked'.

– Background: the case 'Fuse blown' should be separated from 'Power supply blocked' => own BEF (see change in 2.3.28).

– New: Power feed parameter 'Feed point grounded' (espCIgnded). If the para-meter is activated, only the corresponding current injection patterns with 50Hz part are fed in. E.g. instead of f1=-11 f1=+11 is fed in etc..

– Changed: the default assignment of binary input 1 of the current injection controller is now '-62:Current injection_Fuse' (only in config.mdb for WinEDC!)

– Changed: the ratio 'kni' (EspCIMICkni) from the current injection current measurement input, which measures Ici, can from now on ALSO be entered as Unenn Hauptwicklung/Unenn_LHW (so far only reciprocal). The firmware assumes that the current Ici to the primary side is always transformed down. Example: Thus for a usual 20kV E-coil with 500V LHW now both kni=0.0433 and knu=23.1 can be parameterized.

– Changed: the parameter 'Positioning tolerance' has been moved back to the normal controller menu.

– Changed: The value range for the current supply parameter 'Frequency 1' has been reduced from [-85..85] to the currently useful range [-11..12]. As before, however, only the frequency patterns [6,9,10,11,12,-6,-9,-10,-11] The value range for the current injection parameter 'Frequency 2' has been reduced accordingly to [-18..18]. As before, 2nd frequency results symmetrically around 50Hz, i.e. the parameter 'Frequency 2' is not used. In the WinEDC (config.mdb) only these realized patterns will be offered in the future.

– Changed: the parameters 'Transformer R' (espTrafoR), 'Transformer L' (espTrafoL) and 'Use transformer impedance' (espUseTrafoL) are only visible if the current injection algo 'UsU-odIsIf' is used. Up to now they were suppressed only without feature current injection. Note: without feature ENEL and without the current injection algo 'UsUodIsIf' the complete menu branch 'further resources' is omitted now.

– - Changed: the parameters 'Fixed coil quality' (espIFixQFac) and 'Use fixed coil' (espUse-Ifix) are only visible if the current injection algo 'UsUodIsIf' is used. So far they were only suppressed without feature current injection.

- Changed: the parameter 'Quality of E-coil' is now only visible in the menu if the current injection algorithm 'Uns_Uod_Is_If' is used
- Changed: for the feature current injection no 'sysopen' and no password is necessary anymore!
- Changed: Logbook SystemEvent 'Time' is no longer recorded after MasterReset (sysreset=590) (default value). In addition, an event 'Time' is now already recorded from a time difference of approx. +-100...200 ms (previously from approx. -1s / +2s).
- Remark: the REG-L command 'zeit' (resp. 'time'), which is also used by LT, sets the time with a resolution of 1s.
- Changed: at 'automatic phase correction' is always injected with frequency = +11. All other current injection parameters (for 'manual' resp. 'search') are still valid.
- Bugfix: time measurement for arithmetic operations corrected (hidden menu item).
- Bugfix: with REG-L command 'espDebugFlag=0x80000000' instead of 'espDebugFlag=0x8000' all tasks use their full CPU computing power.

V 2.3.30   30.05.2008

- New: automatic phase correction in current injection algo (espCIautoPhi).
- Changed: Setting range of parameter ' Une - nominal value' extended from [50..120] to [20..120].

V 2.3.29   15.05.2008

- Changed: the suppression of the REG-L command 'meld' for 4s after each keystroke removed; was unnecessary. in the background: first preparations for the automatic phase reduction correction in the power supply algo (without visible effect).
- Bugfix: in case of unfavorable timing, the graphic background was no longer restored when deleting (by keystroke) a message in the display (remained empty until the next message!). The error probability increased strongly by frequent 'meld' commands (e.g. in the H-Prog).

V 2.3.28   23.04.2008

- New: own error message ' current injection blocked', if current injection is blocked.
- New: espCIdIres, espCIdIw, espCIdIu, espCIdUres, espCIdUresPi. The new behavior prevents cyclic positioning due to an active Umax_end condition when current injection is used.
- Changed: BAF '62:Current_feed_block' is now suppressed if feature current_feed is not active (as for the other current_feed BAFs 59:..64:).
- Changed: BAF '64:Current-feed_absent' is now active if feature current-feed=1 AND (communication to current-feed is disturbed OR current-feed is 'blocked'). Previously, BAF '64:Power_feed_absent' was active if feature Power_feed=1 AND communication to the power feed was disturbed. The conditions for the derived BAFs '29:Alarm' and '36:Fault_Sum' change accordingly.

  Background: in future, the states of the two circuit breakers in the current injection cabinet are to be reported to the 1st binary input (with BEF 37: current injection _block) of

the CCI and a tripped circuit breaker is to be reported by the REG-DP as an alarm (BAF 64:), as well as the current injection from the REG-DP is then no longer to be used.

– Changed: the default assignment of binary input 1 of the CI controller is now '37:CI_block'; background: see above.

– Changed: At cyclic(!) search with CI the tuning position is not corrected if the net is 'unchanged'. 'Unchanged' means here that the new calculated resonance curve deviates by less than the allowed deltas compared to the previous curve.

– Changed: Error behavior for current injection changed in some places; among others: Behavior ' CI blocked' by behavior 'Alarm: CI missing!' (message ' CI not available'). I.e. if the power supply is 'blocked'; in manual mode (as before): the power supply is deactivated and an error message is sent. in AUTO mode: (as before already in case of failure (e.g. communication interruption) of the power supply): the power supply is deactivated and after a timeout period the 'Emergency mode coil movement' is executed or the 'Error' state is changed. Note: The current supply can be 'blocked' by: BEF '37:Stromeinspeise_Block' or REG-L 'espCIblock' or Stromeinspeise reports itself 'blocked'(currently not used),

– Bugfix recorder: if, via REG-L or WinReg/WinEDC, the recorded value for a recorder channel was changed, the internal scaling for saving the data was not adjusted. I.e. the stored values were in principle correct, but were rounded too coarse or too fine. The error always existed!

V 2.3.27   25.02.2008

– New: REG-L command (espVoEff) for measured value 'Une_eff

– Changed: polish language revised

– Changed: if during tuning, while still Umax or Umax_end threshold is exceeded, the search result is discarded by the controller (check by the netpara-meter) - a new search is now started after the (usually shorter) 'forced delay' (instead of 'trip delay'). This corresponds to the otherwise usual behavior without Umax, Umax_end.

– Changed: Simulation: at simulation start Usync, I1, I2, I1Phi and I2Phi are now set to their default values again (Usync=100, I1=I2=0, I1Phi=I2Phi=0).

– Doc: REG-L command 'ESPdVoType' visibly documented as 'ESPdVoAbs' is also documented.

– Doc: all angles in dpmess 2 are delivered in [+-PI]; was documented wrong in 'help_dp_d_rest.txt'.

– Bugfix: Simulation: the measured value 'Une_eff' is now also simulated. Until now it was always =0; i.e. in V 2.3.26 no earth fault could be simulated.

– Bugfix: Simulation: the monitoring of the current limits for I1 or I2 at feature 'CBR' did not work in the simulation.

– Bugfix: R-control: if the first switch-on delay = 0 s was parameterized, it was not blocked at overtemperature and the first clock in the statistician was not counted. The error existed since V 2.3.26.

– Bugfix: the checksum (CRC) at the end of the measurement value record 6 (fread dpmess 6) was calculated incorrectly.

– Bugfix: Tuning with Umax_end: if the Umax_end threshold is left exactly at the direction change, it could happen that the controller stopped with 'Abgest n.K.'.

V 2.3.26   30.10.2007

- New: parameter 'Check resonance curve' (espChkNetPa2). Factor for checking the calculated resonance curve during tuning. The new algo replaces 'Check grid parameters', 'Trigger factor in steep slope' and 'Check CI -in grid parameters'. This allows the triggering threshold to be extended during tuning and a maximum permissible offset of the curve to be determined. The tuning problems with steep curves should be solved with this. The parameter value =0 deactivates the algo and the old algo is temporarily active again (until algo has proven itself).

- New: Feature CBR: for switch display 0 / 0, an empty box can now be displayed instead of a dash. Adjustable by REG-L command 'espCBRconfig'.

- New: additional input function 'I_coil' for the current transformer measuring inputs I1 and I2. Measures the current through the P-coil.

- New: measurement value 'Une_eff' added (new Bravo code);

- New parameters:
    - Trip hysteresis (default value:0.75; espVoRelHy) Factor to cancel the trip delay.
    - Earth fault hysteresis (default value:0.75; espVEarthHy) Factor to reset the earth fault
    - Umax hysteresis (default value:0.75; espVmaxHy) Factor to reset Umax
    - Umax_end-Hysteresis (Default value:0.90; espVmaxEndHy) Factor to take back Umax_end
    - Une_Overflow-Hysteresis (Default value:0.90; espVoErrLimH) Factor to take back Un-e_Overflow

- New Logbook: new event 'I_coil'; use still unclear! currently only for continuous earth closure.

- New Logbook: new event 'Debug'; only for test purposes.

- New Logbook: new event 'User' added. Additional data can be recorded; see also:

- New REG-L commands espLogUser, espLogUserC, espLogUserF, espLogUserS, espLogUserV.

- Changed: R-control: the thermal image blocks now, if no more complete Im-pulse sequence is possible. And also blocks, if because of excessive Une, suddenly no more repetition pulse is possible. As before, the full displacement margin Unenn is assumed for the remaining pulses/pulse trains. Up to now, the pulse train was aborted as soon as the previously displayed number of possible pulse trains (incorrectly calculated!) changed to 0. I.e. the last possible pulse train was aborted prematurely at high Une.

- Changed: Delay setting range for UserBAFs increased from 0..999.9 to 9999.9 s.

- Changed: R-control: in the display right/above)now the number of still possible pulse sequences ('switch-on time', or 'switch-on time' + n * 'repetition time') is calculated and displayed. Up to now, for repetition cycles > 0, still possible 'switch-on time' + 1 * 'repetition time' was displayed. Why ever!

- Changed: the new measured value 'Une_eff' is currently only displayed for the thresholds 'Uerd', 'Um-ax' and the thermal image of the R-control.

- Changed: Status 3/6 now additionally shows 'Une_eff'; but at the same time removed the values 'Poti%' and 'Ipos%'.

- Changed: Transient recorder removed; was not used before; thus, in the Bravo code, space was made for Une_eff.

- Bugfix: R-control: an active self-hold was not adjusted when 'Self-hold' was re-parameterized (or not deactivated if 'Self-hold'='OFF' was parameterized).

- Bugfix: with the change in the R-control probably also the short dropout at the beginning of an earth fault was fixed, if 'Idle state Un< < Uerd' = ON was parametrized (noticed in V2.3.21 no longer present in V 2.3.33).

- Bugfix: R-control: many clock times and pause times were, depending on the value, wrongly output by +- 100 ms.

- Bugfix: R-control did not clock, if with deactivated temperature behavior, the parameter

- 'Switch-on time max.' < 'Switch-on time' (with repeat cycles=0) OR

- 'Switch-on time max.' <= 'Switch-on time' + 1 * 'Repetition time' (for repetition cycles > 0; independent of the total ON time!) was parameterized. Functioned up to just above 'Switch-on time max.', depend. on 'Temperature max.' (). ().

- Bugfix: With the search method 'current injection' a new search was started constantly, if Umax_end was exceeded at the tuning point. This meant that the Umax_end function could not be used together with the CI.

V 2.3.25   13.06.2007

- Bugfix: Crash when online help asked for unknown REG-L commands

V 2.3.23   01.06.2007

- Changed: the flag espDebugFlag=0x800 (only this flag!) is no longer closed on reset, so that a REG-DPA, after reset, can continue to report as 'REG-DP' instead of 'REG-DPA'. This feature was lost as of V 2.3.16 with the consistent resetting of all DebugFlags. In addition, the device designation ('REG-DP(A)') is updated immediately after the REG-L command 'espDebugFlag' from now on, i.e. a reset is no longer necessary..

V 2.3.22   07.05.2007

- New: BAF '83:Slave_missing': Alarm is active when parallel operation M/S is active but slave is not responding. (the message is also ordered to the alarm collective message BAF '29:Alarm').
- Changed: M/S parallel operation: in case of communication problems to the slave, the master started a new search automatically so far;
- From now on not anymore (superfluous resp. rather disturbing, because networks are still coupled).
- Changed: without feature EOR no EOR-DM is addressed; at deactivation the parameter 'EOR-DM identifier' = 0 is set.
- Changed: 'Icomp' instead of 'Icom' in all display pages.
- Changed: the coil data (runtime, overtravel, backlash, limit switch positions H/T, linearity error) are rounded to 1 decimal place in the automatic coil calibration from now on (so that there are no more differences when comparing parameters).
- Bugfix: with narrow trigger thresholds ('Une-Tolerance') the coil was sometimes not retracted below the Umax threshold during search/tuning when Umax was exceeded. Controller got stuck with message 'SuchStop: Une > Umax'.
- Bugfix: for some resonance curves at the edge of the coil range, no UresPhi was formed in the estimation result (for 'uncertain' 3-point estimates, if too few measurement points were available on one edge). Blemish, for the trigger threshold the angle at the reference point was then simply measured.
- Bugfix: Analog inputs / outputs: when setting the default values, no attention was paid to inputs. From now on all analog inputs are set to function=OFF and 0..20mA => 0..1. The default setting for outputs remains unchanged. In addition, the Reg-L commands 'espAScalX' and 'espAScalY' were generally checked for the value range for outputs. From now on also for inputs on the suitable value range is checked. (Noticed because the previous default scaling for an input channel 1 (0..20mA => 0..100) provoked the error message 'Argument range wrong' when writing back the parameters to the device).
- Bugfix: in the resonance curve display now also the abscissa is labeled with 'Ipos' or 'Icom' (so far always 'Ipos').
- Bugfix: in the menu station name 9 instead of 8 characters could be entered.
- Bugfix: at menu caption 'Hemisphere' only the first 2 characters were displayed.

V 2.3.21   17.01.2007

- New: feature CBR: with the REG-L commands 'espCBRvalid1', 'espCBRvalid2', 'espCBRstate1', 'espCBRstate2' the switch graphic can be controlled with REG-L as an alternative to the BEs.
- changed: Factory setting of the relay-, and BE- functions for the REG-DPA changed:
- Rel 7: Tuned_nK; Rel 8: Tuned; Rel 9: Une_Umin; Rel 10: Une_Uerd; Rel 11: Stoer_Sum;
- BE 9=BEF_Imp_AUTO; BE 10=BEF_Imp_HAND (previously all = OFF).
- Bugfix: at the search with CI the controller drove after the check after the tuning always again into the Umax or Umax_end threshold ==> constantly new search start ==> search abort.
- Bugfix: ELAN error 'too small ELAN telegrams' intercepted (ECSBUS.c and ECSBUSRX.c taken over from REG-D).

V 2.3.20   19.12.2006

- new: French and Spanish languages added
- changed: all languages: beauty corrections

V 2.3.16   17.07.2006

- new: in all not archived FW intermediate states ('in work') a lettering 'TEST' flashes in the resonance curve display.
- new: REG-L commands 'espLogFilFE', 'espLogFilFS', 'espLogFilFSB'.
- Terms unified: 'rest position' (E: home position), 'fixed position if slave' (E: fixed position)
- Default value of the resolution of the recorder channel 'UnePhi' changed from 0.5% to 1%.
- new (taken over from V2.3.11b/c):
- the interferences caused by the current injection chokes into the current injection controller voltage measurement inputs can be compensated:
- new: feature ' CI _OFF CI T'=1 activates the compensation of the CI interferences; no 'sys-open' and no password is required.
- If the CI is active and the voltage measurement inputs are disconnected (only Usync remains), the CI interference can be measured in all voltage channels in the ' CI compensation' menu. Subsequently, these offset vectors are subtracted in phase for all current injection measurements for all voltage channels used, except Usync.
- Notes: it is compensated only if measured with the same side frequencies! the 50Hz measured values are compensated only if the interferences were measured also with 50Hz component. This always makes sense, because then compensation is correct even without 50Hz component. In case of different feed-in power, the offset vectors are adjusted by linear interpolation. in the menu Status 6/6 it is displayed whether a compensation was carried out during the previous measurement.
- new: with the (only internally documented) REG-L commands 'espCIMIVoRe, espCIMIVoIm, espCIMICoRe, espCIMICoIm' the offset vectors can be read and adjusted.
- new: for all measuring channels (Une, I1, I2 and U1..10, I1..6 of the current supply) the parameter 'reverse polarity' is implemented (espVoinv, espI1inv, espI2inv, espCIMICinv, espCIMIVinv). Note: Also a polarity reversal of the current supply controller spg. input

'Usync' is possible and acts like a polarity reversal of all other current supply controller inputs, because all angles are referred to Usync.

- new: with the (only internally documented) REG-L commands 'espCIMIVoVa, espCIMI-VoPh, espCIMICoVa, espCIMICoPh' the vectors can be read and adjusted in polar form.

- new: with the (only internally documented) REG-L command 'espCIMIoffF' the frequency can be read and adjusted at which the current injection interferences are compensated.

- new: Binary inputs can now also be ordered in the UserBAFs (REG-L: espUs-rBAFE, es-pUsrBAFEi).

- new: Parameter 'Fixed coil active' (espIfixState). It is now possible to parameterize whether the fixed coil is permanently switched on or off, or as before (=default) that the state is determined via a BE or REG-L.

- New: Simulation mode '4:U var.' added. In this case Une and UnePhi are independent of the coil position Ipos. Une and UnePhi can be set here (and only in this mode!) by REG-L command (espVo, espVoPhi).

- new: logbook events 'Master', 'Slave' added.

- new: now also an assignment at REG-L command 'espRpos' is possible (only with active simulation).

- new: with the (only internally documented) REG-L command 'espCIMIoffV' the validity of the data for CI -in can be read and adjusted.

- Attention: the following parameters are reinitialized with firmware updates from 2.3.11b/c to 2.3.18 (and higher):

- Feature 'CurrentSupply_OFFCurrentSupplyT', Variable 'CurrentSupplySearchResultOff-set'.

- new: languages Spanish and French added

- new: still missing REG-L commands 'espIPaddress', 'espIPnetmask', 'espIPgateway' for parameters 'IP_Address', 'IP_Netmask', 'IP_Gateway' added. The process control system can request the IP addresses with the command 'fread st#R2l3 0', in the form familiar from REG-D.

- Changed: when parameterizing the interpolation points of the analog outputs and inputs, the analog values are now displayed/edited normalized to 1 (previously they were converted to 100%). Thus the parameterization is now uniform to WinEDC.

- changed: Default value of parameter 'Delay of forced search' changed from 10 to 3 s

- changed: russian menu revised (1. part to commissioning - CI 1/3)

- changed: in menu: Translation 'Self-blocking' into English.

- changed: the REG-L commands 'espBIName', 'espLEDName', 'espRelName' are now documented.

- Note: from config_2006_08_30.mdb the names can be parameterized in the WinEDC. In the menu still not yet!

- changed: Renaming 'Uen' resp. 'Uo' to 'Une'; Renaming 'U12' to 'Usync

- changed: minor text changes in the menu

- changed: when positioning, a hysteresis of 25% is now effective, i.e. positioning is a bit more accurate than checked afterwards.

- changed: Timeout when moving the slave coil until the target position must be reached extended from 5 to 10 min.

- Note: at timeout a new search attempt is started (delayed).

- Changed: in the screen 'Error Help' all active error messages are now displayed one after the other (scroll with keys: F1, Left, Right). Previously, only the last error message was displayed. In addition, newly occurring error messages are briefly displayed.

- Changed: for the error message 'DeviceStatus' from now on the code flags from 'SD.Error.ul&0xffff' are displayed as error number. This error message is now also entered in the logbook, in addition to the 'comes/goes' system event 'Status error'.
- changed: the angles Une, I1, I2 and UresPhi are now formed and displayed as soon as Usync is present (> 25V). Up to now, 'Une angle measurement = ON' also had to be parametrized. Without Usync, the angles are still set to 0° (recorder, logbook, 'ValArray', ...) or not displayed..
- Note: The parameter 'Une angle measurement' is now only effective when calculating the trigger threshold. From now on, it is no longer necessary to parameterize 'Une angle measurement = ON' when searching with current injection.
- changed: Menu 'Poti linearization' renamed to 'Coil linearization'.
- changed: Ipos display in the display screens 'Resonance curve', 'Detail-Anz' and 'Large display': For the display options '+Ifix' and '+Ifix+Iext', the fixed coil and possibly the slave coil are now also included without a valid estimation result (approximation: without trans-foimpedance!), provided that the parameter 'Fixed coil value' is used or the MS parallel operation is active. Display options '+Ifix' and '+Ifix+Iext' now generally show 'Icom' instead of 'Ipos'.
- changed: Functions of the analog inputs reduced to 'OFF' and 'PROG'. Up to now none of the functions is evaluated.
- changed: at search algo 'Current injection' the trigger threshold is no longer checked at transition to Tuned(nk). I.e. it is only searched again if the triggering threshold is not met in the long term (triggering delay). The behavior is now more good-natured towards rushing Une.
- changed: REG-L command 'fread dpmess 5' now additionally delivers the remaining cycles of the resistor control
- the states of all LEDs the currently valid resonance curve estimation results Vres, Vresphi, Ires, Iw and Iu
- Bugfix: different behavior for the search algos 'CoilMove' and 'CurrentSupply' also in 'Emergency mode' ('CoilMove' because current supply is missing). In 'Emergency mode' no further search results were calculated during tuning.
- Bugfix/Attention: up to now the command 'fread st#R2l3 0' did not cleanly deliver only zeros, but delivered the states of the registers a0, a1, a2; i.e. the IP addresses should only be requested by REG-DPs from version 2.3.16 onwards!
- Bugfix: When changing the device identifier or device name via REG-L or PC parameterization, the header in the recorder data was not updated. The WinReg RegView then shows the old identifier. There are problems when appending new recorder data to an existing file. Note: Rename file and adjust 'id=..' manually at the beginning of the file. Workaround until 2.3.16: Change identifier or device name in device menu or with WinReg panel.
- Bugfix: Logbook: EventFilter list error messages: the event '25:Power feed MV missing' was missing.
- (The corresponding error message was already implemented in 2.3.14)
- Bugfix: If the target tuning point is not reached during tuning because of the parameter 'Umax dauernd', a new search was started immediately in versions 2.3.08 - 2.3.18. Now it will be changed again to 'Abgest. nicht komp.'.
- Bugfix: in the screens 'Control technology - IP addresses' the step sizes for adjusting values were not displayed.
- Bugfix: Logbook: the events 'Error messages' could not be suppressed from index 16 on in spite of set filters; also the acknowledgement of these error messages was not suppressed (this error always existed; from V2.3.08).

- Bugfix: CI search algorithm 'UnsIci' has put the resonance curve through the CI measurement value 'Uns' instead of the DP measurement value 'Une' when forming Uref. This caused a constant triggering at wrong parameter 'CI - Phase Usync'.
- Bugfix: start with a suitable display screen after firmware update.
- Bugfix: assignments at REG-L command 'espIpos' were interpreted as % pot position.
- Bugfix: Logbook: In the menu, the UnePhi was displayed in 'Rad' (+- PI) instead of 'Deg' (+-360°) for events that also display UnePhi.

V 2.3.14   30.03.2006

- New parameter 'Higher/lower continuous operation' (espMotConti): When moving the coil via the higher/lower keys or binary inputs '2:Motor_H' '3:Motor_T', the controller automatically switches to the 'continuous operation' function after 3 seconds. This means that the coil continues to be moved higher or lower indefinitely even after the key or binary input has been released. It is stopped with each further command (keys, BE or REG-L), which moves the coil up or down.

- new feature EOR. It must be set if the REG-DP is configured together with an EOR-DM (ENEL, ...). If feature EOR is not set, all dependent parameters are suppressed; Affected parameters: 'Device identifier EOR-DM', 'Block external power supply'.

- New: Feature COM2FIX taken over from REG-D. No passwords and no 'sys-open' required.

- new: Feature CORR_TAB. No passwords and no 'sysopen' are required. The correction table for ground fault is now only accessible when feature CORR_TAB is set.

- New: If the value -1 is assigned to the REG-L commands 'espMotUp' and 'espMotDown', the coil is moved higher or lower indefinitely ('continuous run' function see also above at feature 'RUN'). Both commands work independently of the 'Endurance run' feature.

- new logbook event 'IntermediateResult' records all intermediate results during the resonance curve search. Default state in LogbookFilter: Do not record event!

- new: with the REG-L commands 'espBIName', 'espLEDName', 'espRelName' (only internally documented) the binary inputs, LEDs and relays can be given a freely selectable name. The maximum length of the name is 8 characters. The names are currently not yet used and cannot be parameterized in the menu and WinEDC/WinReg.

- New: CI parameter 'max. dUne by CI'(espCIPddVne) added. The value is sent to the CI and limits there the influence (change of the Une) by the CI.

- new: new error message 'One or more measured values for the power feed search algorithm are missing!' replaces 'internal error 7' (associated EventFilter was only implemented in 2.3.19)

- new parameters 'IP_Address', 'IP_Netmask', 'IP_Gateway' added to menu. REG-L is still missing.

- changed recorder: when changing the parameter 'Value' (value to be recorded) the parameter 'Resolution' is no longer automatically set to the default value. Remarks: WinEDC cannot manage parameter dependent parameters.

- changed: Position of the parameters 'Uerd-Meldeverz.' and 'Erdschlusswischer' in the menu swapped.

- Changed: All dependent functions and parameters are suppressed if the CI characteristic is not set. Affected parameters: all CI parameters under setup control CI and under setup commissioning CI, as well as 'check external coupling', 'quality of E-coil', 'fixed coil quality', 'use fixed coil value', 'use transformer impedance'. Affected functions: Menu page 'Status 6/6', Remark: as before without feature CI are suppressed: display 'CI measured values', REG-L commands 'espCIactiv' and 'espCIblock', search method 'with CI'.

- changed if feature ENEL is not set, all dependent parameters are suppressed.

- Affected parameters: all 'RW', 'Rs1' and 'Rs2' parameters (under setup-commissioning-other-operating-equipment), 'ENEL menu', 'interlocking with drive'. Note: As before, the control of Rw, Rs1, Rs2 and the corresponding BEFs and BAFs are suppressed without feature ENEL.

- Changed: the display of the measured value I1 in the 'Standard display' screen is now no longer suppressed when the ENEL feature is active, but when the ENEL menu is activated. The same applies to the display of 'Ice' instead of 'Ires' in all affected screens.

- changed: in the page 'Status 6/6' no message 'CI not available' is generated anymore in case of missing CI, but only the displayed values are removed (led to unpleasant side effects with ESC key and master reset via F2).

- changed: from now on dependent functions and parameters are suppressed if measuring channels I1 and/or I2 are not available (currently usually only delivered with I1): affected parameters: 'nominal current value', 'knI', 'input function' affected functions: recorder, analog outputs/inputs, display in status menu

- changed: the detuning is now always related to the compensated line capacitance (incl. all fixed coils, slave coils and transformer influences); independent of the parameter 'current display as'. Up to now (after the previous change in > 2.1.21 ?) only the net elements were considered, which were also considered in the display (parameter 'Current display as'). The change affects the calculation of the tuning position as well as the calculation of the current detuning in the display. Thus in 'Tuned' is always actual detuning = target detuning, but with transformer influence is valid: v[A] != Ipos[A] - Ires[A].

- moves, or at the latest at the limit switch. The operation via the WinReg panel works - via the WinEDC panel (V 1.2.1.40) it does not work at the moment!

- changed: if a search result is discarded after positioning, now only the 'Delay of forced search' is waited until the new search is started.

- changed: when deactivating the feature CI, all parameters which are only accessible there are set to their default values. Affected parameters: all CI parameters under setup control CI and under setup commissioning CI, as well as 'check external coupling', 'quality of E-coil', 'fixed coil quality', 'use fixed coil value', 'use transformer impedance'.

- changed: Default values of parameter 'Use fixed coil value' = 'Parameter' (useful if no CI).

- changed: Default values of parameter 'Use transformer impedance' = 'Parameter' (useful if no current is fed).

- changed: when deactivating the ENEL feature, all parameters that are only accessible there are set to their default values. Affected parameters: all 'RW', 'Rs1' and 'Rs2' parameters (under setup-commissioning-other-operating-equipment), 'ENEL menu', 'Locking with drive'. When activating the ENEL feature, the 'ENEL menu' parameter is no longer set = 'On'.

- Changed: Parameter 'Search approximation automatic' (for all CI parameter sets).

- changed: Parameter 'Working voltage E-coil' is now only accessible when feature ENEL is set.

- Changed: Counting mode of analog outputs/inputs changed from 1/2/3 to 0/1/2.

- Changed: Feature EOR renamed (previous name 'EOR_DM').

- Changed: Parameters in the 'Control - Current injection' menu re-sorted.

- changed: Parameter 'Interlock with drive' moved to 'Control - CI' (adapted to WinEDC). Parameter is now only accessible when feature ENEL is set (was previously suppressed only in ENEL menu).

- changed: Parameters 'new search for positioning' and 'emergency operation move coil' moved to 'control' - 'CI'.

- changed: Parameter 'positioning tolerance' default value changed from 1% to 1.5%.

- changed: Parameter 'Check CI mains parameters' default value changed from =0.0(inactive) to =2.0.

- changed: in the English language the term 'digital' was generally changed to 'binary'.

- changed: the notations of the REG-L commands 'EspLogFilSys', 'EspLogFilSyB' and 'EspLogFilErr' have been changed. This should not cause any problems, because they have not been used yet; especially in WinReg and WinEDC not yet!

- changed: for the feature EOR no passwords and no 'sysopen' are required anymore.

- changed: the bobbin position Ipos (Icomp) is now output/managed with corrected bobbin play in the following cases (so far without correction!): in all displays, in the status menu

3, in the analog value output, in the REG-L commands espDebug, espTunePos, e-spIpos, espIposR, in display and recording in the recorder, recording in the logbook, in the data for the control system (fread 'dpmess 2') This leads to the fact that the backlash in the display is no longer visible as dead zone or offset estimation curve and that in the state 'tuned' the detuning 'v' should now always be equal to the target detuning.

- Bugfix: with the software limit switches and with the switching conditions for Rs/Rw (ENEL) an existing coil backlash was not considered up to now.

- Bugfix: wrong time stamp of the recorder data when reading out via WinREG, WinEDC. Time zone and daylight saving time were added twice (when recording the data and again when reading out). Thus the command 'fread°' delivered the local time and 'fread' the local time+time zone+daylight saving time. From now on the recorder data are recorded in UTC time; thus the 'fread' commands provide correct time stamps. When updating FW from an older version to Ver 2.3.15 (or higher), the recorder data will be deleted.

- Bugfix: docu of REG-L commands 'espAScalX' and 'espAScalY'.

- Bugfix: if there is no valid measured value for the fixed coil (e.g. if there is no current supply), the measured fixed coil quality (for 'espCalFixQ' and 'fread dpmess 10') is now defined = 0 (previously approx.1e27).

- Bugfix: the CI estimation algorithm did not take into account an existing coil clearance and then led to a bad result which caused the result to be discarded during tuning and then a new search.

- Bugfix: When using current injection, the wrong current injection parameterSet (always that of 'extStromein-speise') was used in several important places (e.g. normal search). The error existed since V 2.3.12.

- Bugfix: On the display page 'CI measured values' instead of the actually active CI frequencies f1/f2 always the frequencies were displayed, which were parameterized for the manual CI. Independent of this, however, the correct frequencies were fed in. The error probably exists since the page exists.

- Bugfix: Software crash at the online help with the REG-L command '? espCIMICamp' (or also '? esp*'). Probably since V 2.3.04.

- Bugfix: with excessive use of the REG-L commands 'espLinI' or 'espLinR' it could happen that the coil position was calculated wrong for a short time. One effect was, among others, that an estimate was discarded when tuning.

- Bugfix: Rs1, Rs2 and Rw are no longer taken into account without feature ENEL. The estimation becomes a bit more accurate.

V 2.3.13   23.02.2006

- New: The Reg-L command 'espLockBIFV' locks individual binary input functions in local/remote mode. The behavior is not parameterizable (not contained in the menu or Win-Reg/WinEOR).
- Default setting (as before): Inputs are locked neither in local nor in remote mode.
- New: the Reg-L command 'espLockRegL' locks/ignores individual Reg-L commands in local/remote mode. Only the assignments are locked. The list of affected commands is described in the online help. The behavior is not parameterizable (not contained in the menu or WinReg/WinEOR).
- new: the Reg-L command 'espLockKB' locks individual keys in local/remote mode;
- The behavior is not parameterizable (not contained in the menu or WinReg/WinEOR).
- Default setting (as before): In remote mode AUTO, HAND, UP, DOWN are locked.
- Changed: if remote operation is forced with a level at the binary input with function 'Stat:R' when local/remote operation is active, from now on all L/R commands via keys, BEs ('Imp' functions) and Reg-L are ignored. Up to now, they were received in the background and took effect as soon as the signal level at the BE 'Stat:R' disappeared.
- Default setting (as before): most commands are disabled in local mode. changed: Reg-L command 'EspTunePos' is now also assignable: caution is also used internally (see below).
- changed: Parallel operation master/slave: when switching to tuned, the slave now also adopts its current coil position as the 'final tuning position', which is approached when the search is aborted or when Une < Umin (if parameterized accordingly).
- Bugfix: the REG-L commands 'LockKB' and 'LockKBM' now actually output a 'Key is locked' message as documented. Remark: the message text for key lock by local/remote operation has been adapted to this.
- Bugfix: the DebugFlags (espDebugFlag; they activate various test outputs / functions) were not initialized during firmware updates to versions >= 2.3.00, i.e. could be set arbitrarily. The bug existed since 2.3.00.
- Bugfix: current supply by EOR-DM hangs in state 'ext.current supply: blo-cked!' (since 2.3.12)
- Bugfix: at a slave in manual mode the check 'external coupling' was aborted in the master. This error was fixed in V 2.3.09 but has crept back into V 2.3.11 from 11/11/05. (the error was also fixed in V 2.3.11a)

V 2.3.12   09.12.2005

- New: the logbook filters (to prevent certain events from being entered in the logbook) for the system and error message events can now also be parameterized in the menu. So far only by Reg-L. WinEOR and WinReg are still missing.
- new: Statistician: Counter 'search/manu CI' and 'external CI' added.
- new: parameter 'thermal image' (REG-L: EspRTempAct) to (de-)activate the thermal image in the resistor control.
- changed: the REG-L command 'EspLogFilErr' is now documented in general.
- changed: Function of feature CBR changed: Display of switches at signal 0/0; suppression of display Rw, NER; new BEFs '58:CBR_RW', '59:CBR_RWinv', '60:CBR_NER', '61:CBR_NERinv'; change to manual mode, at transition to state 'DauerON'; no automatic start of R-control at earth fault occurrence.

- changed: the REG-L commands, for REG-DE MessHardware, espV0Range, espV050Hz, espR-Type and espRValue still exist, but have no effect anymore. The da-associated list* commands only return an empty list.

- changed: the log event 'ResonanceCurve' now additionally records the values 'Ifix' and 'Iext'. Furthermore, 'Ires' and 'Iw' are now recorded in the currently parameterized form (see parameter 'Current display as').

- Bugfix at feature CBR: the relay with function '25:R_on' rattles if a signal is present at the binary input with function 'CBR_R_on' when the resistance is too hot (from now on, the relay reacts to the rising edge of BEF 'CBR_R_on').

- Bugfix: as of version 2.2.07, Ures was entered in the logbook event 'ResonanceCurve' as primary variable. This caused the value to be displayed incorrectly in the menu logbook (too large by a factor of knu). In the WinEOR logbook only the magnitude is noticeable. From now on, Ures is entered and displayed again as secondary value (matching Une).

V 2.3.11   11.11.2005

- new: the logbook filters (to not enter certain events into the logbook) for relay, binary input, BAF and BEF events can now also be parameterized in the menu. So far only by Reg-L and in WinEORDP. The system events are still missing.

- new: UTC parameters 'time zone' (Reg-L: utcTZ), 'autom. daylight saving time changeover' (Reg-L: utcDST) and 'hemisphere' (Reg-L: utcSH) are now also configurable in the menu. Previously only via Reg-L.

- changed: Master with activated 'Check external coupling' now locks itself during the search against the 'Check external coupling', which the control partner triggers, if both controllers were parameterized as master and with activated check. This operation mode is not useful and should be avoided. (could previously lead to cyclic check if no coupling was detected).

- changed: The default/delivery state of the UTC parameters are now Zone: +1h (previously: 0h), Daylight saving time changeover: YES (previously: NO), Hemisphere: North (previously also North) When setting date and time, the local time is now used (previously the UTC time).

- changed: from this version on the software does no longer run on the REG-DE measuring hardware! It is not supported since 2.3.00! Device is blocked and an error message is displayed.

- Changed: In the menu 'Status 6 /6', the power supply software version is now displayed formatted (x.y.zz). In addition, the SW version string is now also displayed.

- Bugfix: from now on the slave blocks all power feed requests of the EOR-DM ('external power feed')and by REG-L if the master is 'active' (if the master feeds, searches, positions, etc). If the master becomes 'active', the slave interrupts the CI of the EOR-DM. This prevents wrong current injection measurements (wrong search results in the REG-DP or wrong PIL reference values in the EOR-DM), which can occur if both current injections work at the same time or if the 2nd coil is positioned during a current injection.

- Bugfix: with the Reg-L command 'espPoints' (undocumented command) an incorrect/endless output could occur before the first successful search.

V 2.3.10   24.10.2005

- Bugfix: Crash of online help with unknown commands fixed.
- Bugfix: Feature-ENEL: Rw was switched off during the check 'external coupling', independent of the state of the ext. coupling. Now the Rw is switched accordingly only after the detection of an/no ext. coupling.
- *Bugfix: Feature-ENEL: Rs2/Rw were still not switched when moving the coil in slave mode (see also bugfix in V2.3.09), if the controller was sent from search delay to slave mode.*

V 2.3.09   13./14.10.2005

- changed: Feature ENEL: the message 'tripping' is now sent to the EOR-DM only delayed by 10 s, so that with coupled networks the Une change by an 'external CI' at the partner does not immediately lead to an 'external CI' again. (led to oscillation, if the controllers were in single mode despite coupling)
- Bugfix: with a slave in manual mode the check 'external coupling' was aborted in the master.
- Bugfix: Feature-ENEL: Rs2 was not switched when moving the coil in slave mode. The same was true when moving at ground fault, search abort and umin positioning. Now the switching conditions for Rs2, Rs12 and Rw are always monitored as long as no search is active. During a search, switching only takes place after positioning.

V 2.3.07   25.08.2005

- new: with the REG-L commands 'EspLogFilSys' and 'EspLogFilSyB' the recording of general events ('system events') in the logbook can be suppressed.
- new: with the REG-L command 'EspLogFilErr' the recording of error messages in the logbook can be suppressed. Since this is normally not useful, this REG-L command is only documented internally. (as of V 2.3.12 nevertheless documented)
- changed: In the resonance curve display for the abscissa values 'Imin', 'Imax', 'Ires' only max. 5 digits but now always the unit 'A' is displayed.
- changed: Russian translation revised; other minor changes in the foreign languages
- changed: ENEL workaround replaced by espDebugFlag=0x0008
- changed: Current injection algorithm to adjust resonance curve after switching off/turning over current injection (when tuning). It is now forced that the calculated resonance curve runs through the current Une measured by the controller. This solves the ENEL problem.
- changed: Parameter 'max influence on Une by current injection' is sent doubled to current injection after always limiting too early at SEA test tower.
- changed: At the check 'external coupling' now the measured value Une is used preferentially before Uod. Up to now it was the other way round. So that a direct coupling of the E-coils is recognized, even if only one network segment is in operation (Uod is then different).
- changed: the messages 'Alarm collective message' (BAF 29:Alarm) and 'Fault collective message' (BAF 36:Fault_Sum) are now additionally active if the search with current injection is aborted because the measured values are too small.

- Documentation of the REG-L commands of the 'other components' (transformer R/L, Rw, Rs2, Rs12) as well as the 'earth fault location' parameters added to the online help; so far they were only documented internally.
- Bugfix: Controller ended up in state 'Tuned nk' when searching (with current supply) without positioning and without limit switch signal, because it was exactly on the limit of positioning accuracy. From now on a new search is started in this unfortunate case.
- Bugfix: the continuous current injection was not reactivated in the case 'automatic activation' after the termination of an external current injection, if the controller was just in the state trip delay.

V 2.3.06   17.08.2005

- changed: for SuchAlgo with current injection Uref is always measured (temporary workaround until ENEL tuning problem is solved).

V 2.3.05   16.08.2005

- changed: Translation of BEF/BAF lists (abbreviation for 'pulse' signal); all languages.
- Bugfix: Program crash if one of the parameters 'HW amplifier stage' (espCIMIVamp or espCIMICamp) was changed.

V 2.3.04   05.08.2005

- New: Parameter 'HW amplifier stage' (espCIMIVamp or espCIMICamp) for all voltage measurement inputs or current measurement inputs of the current supply. The values are read cyclically from the current supply controller into the REG-DP and only written once to the current supply controller after a change in the menu, WinReg, WinEOR or REG-L.
- changed: Italian translation improved.
- changed: CI search algorithm 'UnsUodIsIf' gave a bad tuning positions if there were big losses in the external coil or the mains.
- Modified: CI search algorithm 'UnsUodIsIf' now provides results that better match the current Une of the controller after switching off/on the CI. (with small triggering thresholds the result was often discarded so far).

V 2.3.03   25.07.2005

- changed: Recorder memory reduced from 576kByte to 512kByte; logbook memory moved. Therefore a FW update from an older version to Ver 2.3.03 (or higher) will delete the recorder and logbook data!
- Bugfix: Reg-L command 'fread° dpmess <nr>' did not return UTC time
- Bugfix: Maximum value of REG-L command 'espLinI' changed from Imax to 9999A; (error message 'argument range exceeded' when loading a parameter set: if 'espLinI' is incremented before 'espImax').

V 2.3.01   01.07.2005

- new: REG-L -commands 'fread dpmess 7..10' for WinEOR service page implemented.
- new: status page 6 shows infos about the power supply controller.
- changed: italian translation improved
- changed: Reg-L command 'MenuEdit' completed;
- changed: Italian language retranslated.
- changed: Documentation of REG-L commands 'ListBIFu2', 'ListRelFu2', 'ListLEDFu2' removed, since as of version 2.3.00 the List* commands can also provide more than 64 elements (commands still exist; but are redundant).
- changed: function of relay 1/2 (up/down) is now changeable
- changed: russian translation improved (messages on the device translated)
- changed: function of binary inputs 1/2 (limit switch down/up) is now changeable
- changed: Russian language retranslated (1st draft).
- changed: Language Czech newly translated.
- Bugfix: data consistency of 'espValArray2/3' values (CI measured values) was not given despite previous 'espValArray 1'.
- Bugfix: REG-L commands 'ListRecChan' and 'ListRecScroll' newly implemented. Up to now only 'ListChan' was available (still exists!).
- Bugfix: Graphic characters in the CoilCalibration procedure adapted to new character sets.

V 2.3.00   08.06.2005

- new: Error message 'CI not available' if an attempt is made to start the CI (F5) in manual mode in the CI measured value display when the CI is not available.
- new: Parameter 'Weighting 2PunktAlgo' (REG-L 'espEst5').new: Key 'Ack' acknowledges error messages (only prepared, because key is not supported yet).
- new: Key 'Remote' changes to remote mode.
- new: Reg-L command 'MenuEdit' added; Attention: only basic function available! Support of the extensions is still missing. With very large numbers, number overflow is possible (test min/max limits explicitly!). For now the resolution = 0.0001 is fixed.
- new: REG-L commands 'espRelType', 'espLEDType', 'espBIType', 'espMIType'. Internal commands to query existing channels. Only with this, e.g. the relays in slot 5 (Rel 25..32) can be managed in the parameterization interface.
- changed: in the menu the 4 current supply parameter sets (Manual, Search, Conti, External) have been moved from the menu 'Control' to 'Commissioning'.
- changed: in the ENEL menu the CI parameter set 'external CI' is now also visible.
- changed: in the menu the texts of the parameters 'Setpoint tuning type' and 'Setpoint tuning' changed; adapted to WinEOR.
- changed: Default parameters in all CI parameter sets changed to 'Frequency'=-11; 'Frequency2'=-13 and 'max Une by CI'=100%.
- changed: in the CI measured value display as well as with 'espValArray..' the measured values are now also displayed with 'external CI' (helpful for ser-vice/commissioning).
- changed: REG-L commands 'espValArray(2/3) <up>' (<up>: for all CI measured values) return =0 if the CI measured values are no longer valid (when switching over or after switching off). Previously, the obsolete measured values were still supplied.

- Changed: 'Local' key changes to Local mode. (corresponds to the 'Local/Remote' key in REG-DP hardware, but there it toggles between Local and Remote).
- changed: in the REG-DPA device the hint 'Set jumper' at the parameters current nominal value I1/I2 has been removed (because the software switches automatically); at the REG-DP the hint has been replaced by a corresponding message window.
- changed: Current measurement input 2 is not available in the REG-DPA ==> complete menu screen 'Current transformer 2 2/2' removed; thus the parameters 'Current nominal value I2', 'kni 2' and 'Input function I2' are no longer accessible. ==> I2 removed from the lists 'Recorder channel functions', 'Analog output functions' and 'Analog input functions' ==> I2 removed from screen 'Status 3/5
- changed: the REG-DE hardware will not be supported in the future (currently the code is still included in the FW)
- changed: menu 'StatusPage 1/5' shows additionally manufacturing date and serial number; the status of the binary inputs/outputs has been moved from 'Status 1/5' to 'Status 2/5
- changed: REG-L command 'SysDebug' replaced by 'espDebugFlag' ('SysDebug' is now used by RegSys platform and thus not available to REG-DP anymore!)
- changed number/default assignment: 18 LEDs, 13 relays, 16 BinEin
- Bugfix: Setting options of current injection algorithm in 'Standard' and 'ENEL' menu unified and suitably translated.
- Bugfix: range of current injection parameters 'Frequency 2' (all 4 parameter sets) extended from [1..85] to [-85..85].
- Bugfix: in the panel display the character set of the own device was used. From now on that of the displayed device. Now also old devices with only one character set are supported. Adjustments to hardware REG-DPA:
- Remark: For the hardware the Urlader V1.20 or higher is necessary. (new flash memory)
- Firmware responds to 'ver' command in DA hardware with 'REG-DPA...' (temporarily suppressible with 'espDebugFlag' command).

V 2.2.16   03.03.2005

- New: Logbook event 'SoftwareUpdate' added.
- Bugfix: after version downgrade without following MasterReset, those parameters were not initialized anymore at the next update, which did not exist in the meantime due to the downgrade. From now on, new parameters are always initialized during an update. Remark: After a downgrade a MasterReset (sysre-set=590) must always be performed!
- Bugfix: Conversion to language-specific character sets now also for REG-DE.

V 2.2.15   16.02.2005

- new Reg-L commands 'ListRelFu2', 'ListLEDFu2', 'ListBIFu2' to display all functions of the inputs/outputs from index 64.
- new: language Russian created (currently still uses English texts).
- changed: the parameter 'Positioning tolerance' moved back to the normal menu.
- changed: Menu layout unified; 'MENU' and 'Display' were adapted to the other screens. - bugfix: on reset (/PowerUp) in state 'search canceled' the controller did not leave 'search canceled'. Now a new search is started as usual.

- changed: On reset (/PowerUp) error messages are now generally deleted (are always in the logbook!); was not always the case before. Fits with the behavior that after reset, if in AUTO, a new search is always started.
- changed: Switch to language-specific fonts (based on FontGenerator version 1.1.6).
- The foreign language files will be managed as Unicode in the future. ScreenE-dit has been extended accordingly and can only be used with Windows NT or higher. From now on the Reg-L outputs are supplied by the device as ANSI character set (previously OEM). To ensure that umlauts are displayed correctly, the setting 'Option - Translate' or 'Terminal - convert OEM font' no longer needs to be set in the WinReg or WinEOR terminal. For REG-L string inputs (e.g. command 'meld') ANSI code must now also be used. I.e. older H-programs with display messages containing umlauts have to be adapted (if the wrong display of the umlauts really disturbs!).
- Bugfix: after version update it could happen that the controller starts in a wrong Srceen; possibly even crashes.
- Bugfix: CI search algorithm 'UnsUodIsIf' sometimes aborted with error message 'internal error 9' (since 2.2.13). Workaround: use at least one CI minimum measured value.
- Bugfix: in the log Une_Phi was only recorded after changes > 57°. Delta for recording reduced to 5°. Note: The deltas for Une (1%) and Ipos (1%) remain unchanged.
- Bugfix: REG-L command 'EspRError = -1' (linearity error from potentiometer if 'with gaps') can now also be written back to the device (error message in WinEORDP removed).

V 2.2.14   14.12.2004

- new: the user-defined output functions ('UserBAFs') 'User_1'... 'User_8' can now also be parameterized in the controller menu.
- new: timeout of 60 s for external current supply in auto mode implemented: after 60 s the 'ext.current supply' is terminated even without enable command.
- changed: Fault conditions that lead to the state 'Fault: Power supply' are now also ordered to the message 'Collective fault' (BAF '34:Fault' and thus also BAF '35:Fault vz' and BAF '36:Fault_Sum').
- changed: if the same error message occurs several times in succession, it is now repeated in the logbook.
- Changed: In case of communication errors with the EOR-DM, the system no longer switches to the error state, but only sets the new BAF '82:EOR_fehlt'. This alarm message is automatically deleted as soon as a communication attempt is successful. In addition, this message will be ORed to the collective alarm (BAFs 29:Alarm and 30:Alarm_vz).
- changed: the DEMO displays are only accessible via F2 if the simulation is active.
- changed: StatusLine 'Search:Endposition' in 'tuning'.
- changed: For the check 'external coupling' the CI parameter set 'Su-che' is used (before set 'Konti').
- Bugfix: Logbook: for event 'ResonanceCurve' all values (Ires, Iu, Ures, UresPhi) were entered as invalid for 'uncertain 3-point results' and thus not displayed. Occurred sporadically, if it was possible to continue in search direction during tuning and therefore further search results were formed.
- Bugfix: The conversion of the resonance curve after switching Rw,Rs12 after a search 'with coil movement' corrected (only for feature 'ENEL').
- Bugfix: Calculation of log level in % corrected. Also the REG-L commands 'fsize log p' and 'fsize log b' returned wrong values.
- Bugfix: Umin limit overflow was not detected in state 'Une < Umin(2)'; since version 2.2.04.

‒ Bugfix: Feature CBR: When opening the 'CBR screen' display, the positions were not drawn if the switch position was not changed.

V 2.2.13   03.11.2004

‒ new: in display CI-in measured values for all CI-in controller measured values at f1/f2 an angle (in relation to Ici) is indicated.

‒ new: feature CBR added! Feature CBR=1: new display 'CBR scheme'; Feature CBR=2: new display 'CBR scheme' and extended R-control. 16 new binary input functions (BEFs) 'CBR_*' implemented (visible with CBR=1/2). New binary output function (BAF) 'R_nCB_Trip' added (visible only with CBR=2).

‒ New BEF 'CBR_R_on' implemented (visible only with CBR=2). New parameter 'Current monitoring NER' (espRmaxIner) added to the menu (visible only for CBR=2). New parameters 'Input function I1', '..2'(espI1MIFu, espI2MIFu) added to the menu. The setting option 'NER' is only visible if feature CBR=' is set; i.e. without feature (or CBR=1) only function='OFF' is currently possible.

‒ changed: Parameter 'Search algorithm' renamed to 'Search method'.

‒ changed: R-control: setting ranges of following parameters extended to 0...999.9: 'switch-on delay', 'switch-on time', 'repetition delay', 'repetition time', 'fall-off delay at idle state=ON'.

‒ changed: Parameter 'Working voltage E-coil' (EspVoRatio) moved to menu 'Data of P-coil1/3'.

‒ Bugfix: SYSCON error in bravo.s and bravo0.s fixed

‒ Bugfix: statistician: text for 'current injection' was not available in most foreign languages.

‒ Bugfix: in Reg-L command espStatist: in heading 'StromEin' added Bugfix: Statistician: without feature Stromeinspeise the 4th meter name was deleted on all pages.

‒ Bugfix: in the menu 'Display' without feature CurrentIns was branched to 'F3:CurrentIns measured values' instead of 'F3:Large display'.

‒ Bugfix: during firmware update to 2.1.11 the feature PP_NO_COMM was lost (was set =0).

V 2.2.12   13.10.2004

- new: 'last' changes in the polish translation.
- new: parameter 'Jumper plugged' (espCIMIVjmp / espCIMICjmp) for measuring range switching for all voltage / current measuring channels of the current supply.
- new: Parameter 'Nominal voltage' (espCIMIVnom) for all voltage measuring channels of the current supply.
- new: Parameter 'Measuring point for max. Une by current injection' (espCIPdVneC) to define which of the Une measuring points (Une,Uod,Uci) is used for limiting the current injection power (see parameter 'maximum Une by current injection').
- new: For the user-defined output functions 'User_1'… 'User_8' it is possible to define with the new bit masks (espUsrBAFIi, espUsrBAFOi), which of the used messages are inverted to the collective message. This setting is not possible in the Reg-ler menu. This setting is not yet possible in WinEOR.
- new: Master/slave parallel operation extended: with the parameter setting 'Move slave coil' = '2:RestPos' (before only 'Off'/'On' was possible; REG-L:espSlaveMove) it is achieved that the slave moves to a defined rest position before a new control operation. The rest position is defined with the new parameter 'Rest position when slave' (e-spl-home2) at the slave.
- new: Controller falls into state 'Search: aborted' if search algorithm=current supply and current supply not available and emergency operationcoil-move=blocked. The BAFs '29:Alarm' (common alarm), '30:Alarm_vz' and '64:Current_feed_absent' are set.
- new: for all I/U measuring channels of the current injection the parameter 'Measured value mi-nimal' (espCIMICmin/espCIMICmin) has been added, with which a minimum measured value can be defined, which is needed in the current injection algorithm for good results. In general, the limit value is valid for both injected spurious frequencies f1 and f2. If the limit value is violated, the search is aborted and the rest position1 is approached (analog search number/time exceeded).
- new: the parameter 'ENEL menu' (espMenuENEL) activates the special menu for ENEL in the controller and in WinEOR. The parameter is automatically set/deleted when setting/deleting the ENEL feature.
- changed: the 50Hz measuring values from the current supply to the REG-DP are from now on supplied in relation to L1. Attention: This means that from REG-DP firmware V2.2.12 the current supply controller firmware Vxxx or higher must be used! Otherwise a tuning 'with angle' is not possible!
- changed: 'Ipot' renamed to 'Ipos'; 'Ires' renamed to 'Ice' (only in the display screens; only for feature ENEL) uniform designations: 'Ifix' for fixed coil; 'Iext' for slave coil(s) or all other coils in the network.
- changed: Parameter 'max. Une by current injection' (espCIPdVne) redefined. Now specifies the max. zero-sequence voltage that may be generated by the current injection. If necessary, the feed-in power is limited in the CI-in. Setting range: [0..120%] of the nominal value of the measuring point used (see parameter 'Measuring point for max. Une by current injection').
- changed: Minimum voltage for Usync reduced from 50V to 25V (minimum value from which Usync is accepted).
- changed: Parameter 'block external CI' extended to: 'no' / 'hand' / 'always' (before BOOL) and moved to the 'normal' menu. The corresponding REG-L command 'espCIHandBlk' was renamed to 'espCI4Block'. This allows to suppress all current injection requests from the EOR-DM (e.g. during commissioning). WinEOR parameterization adapted.
- changed: Functions of LEDs 1..5 can be changed from now on; the default assignment remains the same.

- changed: the parameter 'Current injection algorithm' (espCIalgo) has been moved to the menu: Control - Current injection.
- changed: the function 'Tracking of Uref' (in state 'Tuned(nk)') is now only active if 'CoilMove' is parameterized as SearchAlgo (i.e. not with CI!).
- Changed: all REG-L commands 'espCI*' are now also available without CI feature. Exceptions: 'EspCIactiv' and 'EspCIblock' are still only available with CI characteristic set.
- Changed: Feature 'SEA' renamed to 'ENEL'.
- Bugfix: the check 'external coupling' and an external CI request are now mutually locked.
- Bugfix: no return from trip delay to Tuned if a ground fault wiper occurred in between.
- Bugfix: with continuous current injection the trip condition 'dIres' was not considered. I.e. up to now there were no trips by estimation results of the 'continuous CI'.
- Bugfix: cyclic external current injection after violating the triggering threshold fixed. Remark: double external current injection (1. triggered by EOR-DM, 2. triggered by REG-DP) is accepted.

V 2.2.11   17.08.2004

- new REG-L commands:
  - o espCaIfix returns the calculated value of the fixed coil from the measured values (only for CI search algorithm '03:UnsUodIsIf').
  - o espCaIfixQ returns the calculated quality of the fixed coil from the measured values (only with CI search algorithm '03:UnsUodIsIf')
  - o espCaTrafoL returns the calculated reactance of the transformer from the measured values (only with CI search algorithm '03:UnsUodIsIf')
  - o espCaTrafoR returns the calculated active resistance of the transformer from the measured values (only with CI search algo '03:UnsUodIsIf')
- new: SEA: with the parameter 'Use fixed coil' (espUseIfix) is defined, whether in the CI search algorithm the parameter or the measured value for Ifix is used.
- new: SEA: the parameter 'Use transformer impedance' (espUseTrafoL) is used to define whether the parameter or the measured value for TrafoL and TrafoR is used in the CI search algorithm.
- new: for the user-defined output functions 'User_1'... 'User_8' a message delay can now be parameterized: Parameter 'Message delay User_1..8' (espTUser-BAF)
- new: with the parameter 'Reset behavior' (espResetHand) it is defined whether the controller changes to manual mode after a reset (PowerUp).
- new: with the parameter 'Emergency operation coil-move' (espCIdeadMod) it is defined whether the controller determines the resonance curve with the search algorithm 'CoilMove' if the current supply is not available.
- new: BinaryOutputFunction '58:Batt_empty' is set if the RAM buffer battery is almost empty.
- new: parameter 'block external current supply' (espCIhandBlk) is used to define whether the controller should block external current supply requests (from EOR-DM or via espCIactiv=4) in manual mode.
- changed: WinEOR parameterization adapted to current status.
- changed: Reg-L command 'EspSlavePrior' renamed to 'EspSlavePrio'. Before 'syntax error', because too long!
- changed: at REG-L commands 'espUserBAFI', 'espUserBAFO': <aufz>= User1..8 and <index>= BEF/BAF-BitGruppe Was reversed before!

- changed: Parallel program 'without comm.': the time before a trip, in which the net must be stable (no other controller moves) is now adjustable with the parameter 'Net scan time' (EspTNetScan). Default:20s

- changed: The value range of kni and knu of all measurement inputs of the current supply (-controller) refined to 4 decimal places; and negative values removed [0.0001..4000].

- changed: in all display pages: the writing 'Master' is not displayed if the potential slave is not in 'Slave' state (e.g. manual operation, ground fault, blo-cked...).

- Attention: all other functions of a master remain unaffected.

- changed: Switching possibility of display option 'Display Une in %/V/kV' with F2 in the display screens has been removed. Switching option of display option 'Parameter in Une_Ir_Iw/k_v_d' with F3 in standard display screens has been removed. Note: The toggle option with F3 in the large display between 'Ipos' and 'v' remains, since it is not parameterizable.

- Changed: Value range of parameter 'Uerd message delay' increased to 0.0 ... 999.9 enlarged

- changed: Value range of parameter 'Search cycles max.' increased to 1 ... 99 enlarged

- changed: SEA: Switching logic of Rs2 redefined: BAF '68:Rs2_on'=1 means now Rs2 is short-circuited (before =1 meant for 'is active'; thus the outputs and inputs had to be inverted => led to misbehavior in the algo if state feedback (BEF '39:Rs2_on') was not used). The parameter names were adapted.

- changed: SEA: switching logic of Rs12 redefined: BAF '69:Rs12_on'=1 means now Rs12 is short-circuited (before: see above).

- changed: SEA: switching logic of Rw: Rw is switched on if neither master nor slave mode, or master mode and Ipos < threshold (parameter is unchanged).

- changed: Standard display: if SEA characteristic is set, the measured value I1 is not displayed.

- Bugfix: SEA: if no positioning was necessary during a search, Rw and Rs2 were not switched. Might be necessary if the controller becomes the master.

- Bugfix: SEA: if search was aborted, a new search was started after external current injection (EOR-DM). Leads to endless search! From now on, the EOR-DM is no longer notified of 'search completed' when the search is aborted.

V 2.2.10   02.07.2004

- new: parameter 'check external coupling' (espCouplTest) determines whether an 'external coupling' is to be taken into account in master/slave parallel operation when tripping.
- new: the new binary output functions '43:CouplerMessage' and '44:CouplerNetwork' signal that the closed busbar coupling has been reported to the controller (43:) or detected by the controller (44:).
- New: Parameters 'external coupling factor 1-2' (espCoupl12) and 'external coupling factor on/off' (espCouplOn) for testing an 'external coupling'.
- New: Control of fixed coil implemented.
- The new parameter 'fixed coil control' (espIfixActiv) defines whether the fixed coil should be switched off permanently (=0:OFF), switched on permanently (=1:ON) or switched as required during tuning (=2:auto). The new parameter 'Slave priority' (espSlavePrio) defines whether in parallel operation the fixed coil should be switched before the slave coil (=0:FixVorSl) or vice versa (=1:SlVorFix).
- New: Parameter 'Quality of fixed coil' (espIfixQFac) determines the quality of the fixed coil. Currently not used yet!
- changed: Standard display 'Iext' renamed to 'Iext' and always displayed.
- changed: Bugfix at calculation of tuning position if display option '+Ifix+Islave'.
- changed: Output function of relay 11 (status) is now changeable.
- changed: If the parameter 'Fixcoil' = 0 (inactive) is set, the measured value 'If' is used in the current injection algorithm 'UnsUodIciIs' ('SEA'-Algo); otherwise the given value 'Fixcoil' and 'FixcoilGoodness' (if != 0, thus 'active') is used for calculation.
- changed: if an ELAN error occurs during the 'external coupling' check during communication with the slave, this is reported with the collective messages (BAFs) '34:Fault', '35:Fault vz' and '36:Fault_Sum'. The controller goes to fault.
- Current supply ParaSet 'Measure' installed; no visible effects. In slave mode, it is now possible to activate the CI via REG-L; this also enables a request for CI from the EOR-DM.
- Attention: an estimation of the master can be disturbed by this, i.e. you have to pay attention to different CI frequencies or temporal staggering!
- Error codes for power feed requests from EOR-DM to REG-DP newly sorted

V 2.2.09   01.06.2004

- - new: parameter 'Quality of fixed coil' (espIfixQFac) determines the quality of the fixed coil. 'e-spIfixQFac' still returns 'syntax error' works only from 2.2.10!!!
- new: BinaryOutputFunction '27:PotiWarning' becomes active if the PotiPosition is not plausible (Poti is in gap).
- new: For the new user-defined output functions 'User_1'... 'User_8', bit masks can be used to define which of the binary input functions (BEFs) and which binary output functions (BAFs) are output as a 'collective message' (OR-linked). For the time being, only the REG-L commands 'EspUserBAFI' and 'EspUserBAFO' are available for parameterization.
- new: The new parameter 'Umax Delay' (EspTDVmax) determines the minimum duration for the violation of the Umax threshold to be reacted to.
- new: The parameter 'Rs12 control' (espRs12Activ) defines the state of the binary output function 'BAF_Rs12_on'. The states '0:OFF', '1:ON' can be set. A switching condition (2:auto) is not yet defined.

- − new: if a switching action is detected at the busbar coupling (via BEF_KUPPLUNG or REG-L), a new search is triggered after the tripping delay has elapsed. Irrespective of whether M/S parallel operation is (de)activated with the switching action; i.e. even if 'Parallel operation active' = 'OFF' or 'ON' is parameterized.

- − changed: the REG-L command 'espTuneVV' has been removed. The corresponding parameter 'Setpoint tuning in V' was already removed in V2.1.06 on 26.03.02.

- − changed: M/S parallel operation: a controller in manual mode does not become a master.

- − Changed: If the binary input functions (BEF) 'Rw_on', 'Rs12_on', 'Rs2_on' are used (an input is assigned with this function), the state of the BEF (the feedback messages) are processed as actual switching states in the controller instead of the binary output function (BAF) 'Rw_on', 'Rs12_on', 'Rs2_on'. Up to now, these BEFs have not been evaluated.

- − changed: at the parameter 'Rw control' (espRwActiv) now the states '0:OFF', '1:ON', '2:auto' are adjustable; before '0:OFF', '1:ON'(worked like 'auto'). Thus the parameter 'Idle state Rw' (espRwState) became superfluous/removed.

- − changed: at the parameter 'Rs2-Control' (espRs2Activ) now the states '0:OFF', '1:ON', '2:auto' are adjustable; before '0:OFF', '1:ON'(acted like 'auto'). This made the parameter 'idle state Rs2' (espRs2State) superfluous/removed.

- − changed: Differentiation for the new filter cards of the current measurement inputs (HW change: extended current range; from week 21/04).

- − changed: in 'detail display' the bracket with fixed coil next to the Ipos value has been removed - instead Ifix and Iext are displayed in the last line above the analog display. But are only displayed if the respective value is > 0A.

- − changed: Abbreviation 'IC' for 'current injection' changed to 'CI'. Especially all Reg-L commands: espIC* in espCI*

- − changed: Current injection estimation algorithms divided into short parts, so that the control task is cyclically run through again every max. 50-100ms (i.e. reaction time of the controller is again in the range of 100ms).

- − changed: CI: negative values for parameter 'Frequency 1' allowed for in-verse CI (without 50Hz)

- − changed: SEA: after Rw,Rs-switching at SearchAlgo with current injection a new search is started (no longer converted).

- − Bugfix: with parameterized, but not active, parallel program 'without comm' was waited after expiration of the trip delay nevertheless that the Verlage-rungsspannung does not change for approx. 20s ('the net is stable!').

- − Bugfix: conversion of the net characteristics(search result) after switching the SEA resistors Rs, Rw improved ==> still does not fit!!!

- − Bugfix: the SEA resistors Rs, Rw are switched immediately into the idle state, if the respective control is deactivated.

V 2.2.06   19.03.2004

- − new: ParameterTable 'Transfer behavior of the E-coil' (espCoilCompR, espCoil-CompF) implemented; currently only used for current injection with SEA-Algo.

- − new: current injection: SEA-Algo implemented current injection estimation algorithms '01:UnsIci', '03:UnsUodIciIs' (SEA-Algo) tested exact conversion Ipos to Icomp (to 'net capacity' instead of 'coil position') implemented

- − approximation for conversion of search results from 'CoilMove' to the extended equivalent circuit (XLnet) adapted.

- − Bugfix: CI cannot be switched off after FW update has been performed

V 2.2.05   18.03.2004

- new: if the SEA feature is active, the EOR-DM is informed when the coil is operated (motor on, motor off).
- new/changed: new binary output functions (BAFs)
  - o 58:reserve not used; not visible
  - o 59:current_feed_external 'external CI' is active (only accessible with feature current_feed)
  - o 60:Current_feed_alive CI is accessible (only accessible with feature CI)
  - o 61:Current_feed_on CI is active / feeding in (only accessible with feature Current_feed)
  - o 62:Current_feed_block CI is blocked (only accessible with feature Current_feed)
  - o 63:Power_feed_fault Power feed is faulty (only accessible with feature Power feed)
  - o 64:Current_feeder_absent CIer is not accessible (only accessible with feature Current_feeder)
- new: new binary output functions (BAFs)
  - o 65:Fix_on Level control for fixed coil switch (currently still without function)
  - o 66:Imp:Fix_on Switch-on pulse for fixed coil switch (currently without function)
  - o 67:Imp:Fix_off Switch-off pulse for fixed coil switch (currently still without function)
  - o 68:Rs2_on Level control for switch Rs2 (only accessible with feature SEA)
  - o 69:Rs12_on Level control for switch Rs12 (only accessible with feature SEA)
  - o 70:Rw_on Level control for switch Rw (only accessible with feature SEA)
  - o 71:Imp:Rw_on Switch-on pulse for switch Rw (only accessible with feature SEA)
  - o 72:Imp:Rw_off Switch-off pulse for switch Rw (only accessible with feature SEA)
    73:Rs2_Alarm Rs2 feedback faulty (currently without function) (only accessible with feature SEA)new: if the SEA feature is active, the EOR-DM is informed when the coil is operated (motor on, motor off).

- changed: Rename Rs1 <=> Rs2; Attention, the following REG-L commands are renamed:
- old: espRs1Activ, espRs1Off, espRs1On, espRs1State, espRs1Value, espRs2Value
- new: espRs2Activ, espRs2Off, espRs2On, espRs2State, espRs2Value, espRs1Value
- new: current injection: 'voltage correction table Uci -> Uns' implemented (REG-L still missing)
- changed: Current supply parameter 'Frequency-Mode' (espCIPFMode) for all 4 parameter sets removed.
- Current supply parameter 'Search-Mode' (espCIPSMode) for all 4 parameter sets removed.
- changed: Menu branch 'Control - Current supply - Inputs-Outputs' moved to 'Commissioning 1/2 - Current supply Inputs/Outputs'.
- changed: if feature CI active, display page 'Large display' is replaced by 'CI measured values' (currently also without feature!)
- changed: Parameter 'Current display incl. slave pos.' (espAddSlPos) extended and renamed to 'Current display as' (translations missing!);

- changed: depending on whether only the coil position or coil position + other coils are displayed when displaying the current values (Ipos, Ires, resonance curve, ...), the coil position is displayed as 'Ipos' or 'Icomp'. The mode is determined by the Pa-rameter 'Current display as' and whether there is a valid estimate.
- changed: at PowerUp in state 'Abgest(nk)' a new search is started automatically (before: still in 'Abgest(nk)')
- changed: at PowerUp error messages are acknowledged automatically
- changed: with the parameter setting 'Tolerance range dIres' = 0, the trigger condition can be deactivated via 'dIres'. In case of changes of known elements in the network (-equivalent circuit diagram), e.g. fixed coil on/off, CI on/off, slave position, etc., the equivalent circuit diagram is no longer adapted, but a normal trip is accepted, if this known switching action exceeds the trip threshold. In addition, the displayed resonance curve and the displayed Ipos are consequently no longer converted.

V 2.1.21   17.05.2004

- new: Reg-L commands 'fread dpmess 5' and 'fread dpmess 6' for control system connection integrated
- new: with the CI parameter 'Poti connection' (REG-L: espCIPotPort) it is defined whether the potentiometer input is used at the REG-DP or at the CI controller.
- new: Statistic: Runtime of CI added
- new: current injection implemented feature 'CI' added: possible states: 0: off; 1:enabled; password: '170303' when setting the feature the following parameters are set: new search for positioning='ON' when removing the feature the following parameters are reset:
- SearchAlgorithm='CoilMoving'; continuous current injection='OFF'; cyclic triggering=0; new search for positioning='OFF'.
- new output functions for the binary outputs (also visible without feature 'CI')
  - o 'Current_feed_on': CI is active
  - o 'Current_feed_block': CI is blocked
  - o 'Current_feed_fault': CI is faulty; must be acknowledged like all other faults new input functions for the binary inputs (also visible without 'Current_feed' feature)
  - o 'Imp:Current_feed_on': a positive edge at the input activates the CI (only effective in manual mode).
  - o 'Imp:Current_supply_off': a positive edge at the input deactivates the current supply (only effective in manual mode).
- 'S:Current_supply_Block': a signal level at the input blocks the current supply. New parameters in the menu and via REG-L
  - o 'continuous current injection' (espCItuned)
  - o 'triggering threshold dIres' (espCIdISrch)
  - o 'interlock with drive down' (espCIImaxMot)
  - o 'cyclic triggering' (espCIdTSrch)
  - o 'new position after positioning' (espCISVerify)
  - o 'COM address' (espCIAdr)
  - o 'COM address slave current supply' (espCIAdrSl)
  - o 'Manu current1' (espCIPI1 1)
  - o 'Manu Frequency1' (espCIPf1 1)
  - o 'Manu Phase1' (espCIPphi1 1)

- o 'Manu Current2' (espCIPI2 1)
- o 'Manu Frequency2' (espCIPf2 1)
- o 'Manu phase angle2' (espCIPphi2 1)
- o 'Manu max. influence on Une' (espCIPdVne 1)
- o 'Manu frequency mode' (espCIPFMode 1)
- o 'Manu search mode' (espCIPSMode 1)
- o 'Manu search approach automatic' (espCIPASMode 1)
- o 'Search current1' (espCIPI1 2)
- o 'Search frequency1' (espCIPf1 2)
- o 'Search phase1' (espCIPphi1 2)
- o 'Search current2' (espCIPI2 2)
- o 'Search frequency2' (espCIPf2 2)
- o 'Search phase2' (espCIPphi2 2)
- 'Search max. influence on Une' (espCIPdVne 2)
  - o 'Search frequency mode' (espCIPFMode 2)
  - o 'Search search mode' (espCIPSMode 2)
  - o 'Search Approach Automatic' (espCIPASMode 2)
  - o 'Conti current1' (espCIPI1 3)
  - o 'Conti Frequency1' (espCIPf1 3)
  - o 'Conti Phase1' (espCIPphi1 3)
  - o 'Conti Current2' (espCIPI2 3)
  - o 'Conti Frequency2' (espCIPf2 3)
  - o 'Conti phase angle2' (espCIPphi2 3)
  - o 'Conti max. influence on Une' (espCIPdVne 3)
  - o 'Conti frequency mode' (espCIPFMode 3)
  - o 'Conti search mode' (espCIPSMode 3)
  - o 'Conti search approach automatic' (espCIPASMode 3)
  - o 'External current1' (espCIPI1 4)
  - o 'External frequency1' (espCIPf1 4)
  - o 'External Phase1' (espCIPphi1 4)
  - o 'External current2' (espCIPI2 4)
  - o 'External frequency2' (espCIPf2 4)
  - o 'External Phase2' (espCIPphi2 4)
  - o 'External max. influence on Une' (espCIPdVne 4)
  - o 'External frequency mode' (espCIPFMode 4)
  - o 'External search mode' (espCIPSMode 4)
  - o 'External search approach automatic' (espCIPASMode 4)
  - o 'CI-in transient time' (espCItTrans)
  - o 'Show search results' (espCIShowRes)
  - o 'Use search results' (espCIPosRes)
- new parameter 'EOR identifier' (espCIEORkenn)
- new: hardware detection: at slot 1 now also the RegRel 4 card (16 relays) is detected and managed in the FW. Furthermore cards with empty EEPROM in this slot are treated like a RegRel 1.
- new: procedure for search algorithm 'CI frequency band' for simulated CI added (with 3 new error messages)

- new: with the new parameter 'Search-Algorithm' (Reg-L: espSrchAlgo) different methods for resonance point search can be selected:
    - o 0:CoilMoving traditional search: by passing the E coil and recording Une.
    - o 1:CI_F_band CI with variable frequency
    - o 2:CI_F_Pair CI with 2 concrete frequencies

  Later in the menu, the parameter is accessible only when the 'CI' feature is set.

- new: new COM3 telegram types 'DevMemR/W' implemented; with new associated Reg-L commands: espDevMemC, espDevMemI,

- espDevMemL, espDevMemF. The new types are used for the first time for communication with the power supply (power supply controller) for feature 'Power supply'.

- new: Feature SEA: The control of Rs2 (via new BAF: 'Schalt_Rs2') and Rw (BAF: 'Schalt_Rp') is now realized. BAF 'Schalt_Rs2'=1 means, Rs2 is active; 'Schalt_Rs2'=0 means, Rs2 is switched off/bridged. BAF 'Schalt_Rp'=1 means, Rw is effective; 'Schalt_Rp'=0 means, Rw is switched off/bridged. (Note: After Rs2 is short-circuited at SEA, BAF 'Schalt_Rs2' INVERTIATED must be used for this). With the parameters 'Rs2 control'=OFF/ON (espRs2Activ=0/1) or 'Rw control' (espRpActiv) the control can be (de)/activated. With the new para-meters 'Idle state Rs2' (espRs2State) or 'Idle state Rw' (espRpState) the state can be determined when the control is deactivated. Switchovers are only performed in manual mode or when the end position has been reached at the end of a search. The changeover takes place according to the following conditions:
    - o Rs2 is switched on (BAF 'Switch_Rs2'=1), if Ipos (incl. Ifix, SlavePos and TrafoL) > parameter 'Rs2 ON threshold'.
    - o Rs2 is short-circuited (BAF 'Schalt_Rs2'=0), if Ipos (incl. ...) < parameter 'Rs2 OFF threshold'.
    - o Rw is switched on (BAF 'Schalt_Rp'=1), if Ipos (incl. ...) < parameter 'Rw ON threshold' or no M/S operation
    - o Rw is switched off (BAF 'Schalt_Rs2'=0), if Ipos (incl. ...) > parameter 'Rw OFF threshold' and master/slave operation
    - o Rw is generally switched on in slave mode.

  After switching at the end of a search, the resulting resonance curve is calculated and used from now on!

- New: If the SEA feature is activated, the binary input function '37:Switch_Rs12' and the binary output functions '58:Switch_Rs2' and '59:Switch_Rp' are available. They reflect the switch states in the SEA equivalent circuit diagram.

- New: Function extension of continuous current injection:

- With the new setting option of the parameter 'continuous CI = au-tom.', the continuous CI is automatically activated if Une, without CI, would be below the new parameter 'konti.CI autom. ON' (espCI-tuneOn). Correspondingly, the CI is automatically deactivated if Une, without CI, is above 'conti.CI autom OFF' (espCItuneOff). (espCItuneOff). (CONDITION NOT IMPLEMENTED yet (currently with ='autom.' always activated)!!!)

- new: if feature SEA active: with new parameter 'Measuring point Une' (REG-L 'espVoMP') is parameterized, if Une is measured directly at the E-coil or at the busbar. Has only effects if the transformer inductance != 0 (at present still no effects!!).

- new: REG-L commands 'fread dpmess 5..6' for control system connection added.

- extended: REG-L command 'fread dpmess 4' additionally supplies the H-Prog registers a20 ... a24 (previously =0('reserved')) for the control system connection.

- extended: REG-L command 'fread dpmess 4' now additionally supplies the states of the inputs/outputs of the CI controller (if CI feature is active, otherwise =0) for the I&C connection.

- SEA parameter 'Measuring point Une' (EspVoMP) removed. As before, Une is always measured at the P-coil.

- SEA parameter 'Rated spg. for A values' (espVmains) removed. Is planned later as a replacement for 'knu'.
- Note: The parameter is covered by the parameters 'Nominal value of voltage transformer' * 'Wander ratio Uo (knu)'.
- changed: when changing the parameter 'nominal voltage Un_sec' the resonance curve is set invalid (before the unchanged resonance curve was misinterpreted).
- changed: when calculating the tuning point, the transformer inductance is now taken into account. The used approximation ignores Rw, RfeRL, Rs2, Rs1 and Rt.
- changed: in the displays (standard, BigDisplay, resonance curves-) the transformer inductance is now taken into account for Ipos, Ires, Iw, Imin, Imax and v. The used approximation ignores Rw, RfeRL, Rs2, Rs1 and Rt.
- changed: REG-L docu for analog outputs/inputs corrected/added;
- changed: english menu texts revised.
- changed: Coil calibration: extended the limits within which the found limit switch positions are accepted as valid from 0...100 %(Rproz) to -0.5...100.5 %. Error case: The calibration data was declared as 'not valid' because of a limit switch at just below 0.0% (potentiometer stop + measured value noise). This means that the coil overtravel and backlash is not used and positioning problems could occur.
- changed: Calculation of random delay times in parallel program 'without comm' changed:
- variable trigger delay: normal trigger delay (at least 20s) + 0...180s
- variable forced delay: normal forced delay (at least 20s) + 0...180s
- changed: espAIOType now returns '0:not populated' for not populated channels; so far the request was ignored (as usual for all other Ana-IO commands).
- changed: unified the setting range of the parameters for the ground fault correction table to [-999.9 ... +999.9].
- changed: When reading out the logbook data (REG-L: 'fread log...', 'fread log.h...')a check sum (CRC16) is now transmitted additionally
- changed: Rename Rp => Rw; Attention, the following REG-L commands are renamed:
- old: espRpActiv, espRpOff, espRpOn, espRpValue, espRpState
- new: espRwActiv, espRwOff, espRwOn, espRwValue, espRwState (removed since 2.2.09)
- changed: Sequence with CI search: After a search trigger, the possibly existing result of the 'continuous CI' is ignored from now on and a new search (with high power) is started in any case.
- changed: Differentiation for the new filter cards of the current measurement inputs (HW change: extended current range.
- changed: the X-values of the interpolation points of the analog inputs/outputs must only be 'monotonously increasing' instead of 'strictly monotonously increasing'; i.e. double interpolation points and 'staircase' functions are now possible.
- changed: in the states 'Tuned', 'Tuned_nk' and 'Tuned_in' repositioning is no longer done, if suddenly (by external influences) the tuning position could be improved (e.g. by parameter changes, external positioning, ...). Thus a coil movement is only possible again after a triggering! Also the change between 'Tuned' and 'Tuned n.k.' is no longer possible.
- changed: The menu branch of the analog inputs/outputs has been completely revised. Now only shows existing channels.
- changed: Display messages are now deleted after each keystroke (like REG-D). As before, messages are suppressed for 4s after each key press.
- changed: Extension of R-control: With the parameter 'repetition time' (espR-Ton2) the pulse duration of the repetition pulses can now be set separately. With the parameter 'RestState at Une < Uerd' = ON (espRonMode) the resistor is switched on permanently outside the earth fault. In this mode, the time after which the resistor is switched off at

the start of the earth fault is determined with the parameter 'Dropout delay at quiescent state = ON' (EspRToffDely). Also in this mode the resistor is always switched off in case of blocking. The 'number of remaining possible watt residual current increases' shown in the display is now calculated from the total switch-on time = Tone + 1*Tone2 (if repetition cycles > 0) + Tvz_off (if drop-out delay at quiescent ON).

– changed: When pressing keys on the panel, the backlight on the device is no longer activated (the screen saver is also not terminated).

– changed: unused binary input/output functions removed from the lists: BEF 28 'Sla-ve', BAF 19:restpos2, BAF 27:power supply, BAF 43:reserve, BAF 44:reserve

– changed: when removing the feature 'pp_no_comm' the parameter is reset from Parallelbetrieb='ohne Komm' to ='none'.

– Bugfix: the Reg-L command 'sysstack' displayed task 9 incorrectly and task 10 not at all.

– (since the installation of Task 10 in V2.1.10)

– Bugfix: RTC-access with semaphore from secured

– Bugfix: REG-L command 'EspSrchAlgo' added to online documentation

– Bugfix: from version 2.2.00 the controller stopped at the limit switch during the search 'Une < Umin', instead of running down the coil to the 2nd limit switch. After expiration of the max. search time ('Motor run time max.') the search was aborted. => corrected!

– Bugfix: with MasterReset it could come from V2.2.00 to a wrong 'Default'-resonance curve in the display.

– Bugfix: error in the search process fixed (It came by rebuilding for CI into the V2.2.02!)

– Bugfix: the menu linearization table was not left since version 2.1.09 at the 2nd ESC keystroke.

– Bugfix: in the menu the scaling of the analog inputs was corrected. Now the ScalX value (before ScalY) is entered as 100% value.

– Bugfix: logbook the single suppression of BEF and BAF events worked only for the first 32 BEF/BAF. (cf.2.1.15)

– Bugfix: Docu of RegL command 'EspFailPos' was missing until now.

– Bugfix: Crash if no final resonance curve is available after a search abort (after master reset).

– Bugfix: documentation of EspROnMode, EspRToffDely, EspRTon2 included in online documentation.

– Bugfix: with earth fault wipers in state 'Tuned', 'Tuned_nk', the binary output functions '14:Abgest' and '15:Abg_nk' were taken back temporarily.

– Bugfix: Inputs which have to be confirmed/cancelled with OK/ESC could not be confirmed(OK). (from 2.1.16) (=> recorder data not deletable, logbook data not deletable, change of the value to be recorded in the recorder)

– Bugfix: when activating the Une angle measurement it could happen that the controller changed from 'Tuned/(nk)' to the state 'Tuned:Umin'.

– Bugfix: in the standard display the value 'Uresphi' was not displayed under certain conditions. Uresphi' was not displayed in the standard display under certain conditions.

– Bugfix: in the menu 'Data P-coil 3/3...' F1 did not react.

– Bugfix: english error message 'end switch 'low'\0 not found !' reported erroneously '...'high'...'.

– Bugfix: in very unfavorable moments, the search command 'espsearch=1' was ignored (e.g. at the same time to the switch Abgest. <-> Abgest.n.k., at the same time to the Uref redraw, at the same time to the switch from/to trigger delay, ...).

– Bugfix: when updating to 2.1.00 the recorder memory was reduced (768kB => 576kB). Only after the update from < 2.1.00 to >= 2.1.02 the memory is consistently cleared. If an

update to 2.1.00 or 2.1.01 has been performed in the meantime, it is possible that the recorder recording is disturbed (statistically in 25% of the cases):

- o Opening the recorder display leads to a crash of the user interface (keyboard/display).
- o A readout of the recorder data leads to a crash of the corresponding interface (COM1, COM2) From now on, the deletion of the recorder memory is made up for in these cases. I.e. the error is no longer propagated during the update.

− Bugfix: when re-parameterizing the function of an analog output to 'OFF', the output signal stopped. From now on the signal is set once to 0.0. (only once, so that the Ana, AnaN commands can be used when OFF).

− Bugfix: an active screen saver was not taken back when deactivating by parameterizing at the panel; furthermore the display could be switched off by the system command 'syssto=0' in spite of deactivated saver.

− Bugfix: Statistic counter 'Trips' had not counted at the transition from 'Tuned(nk)' to the trip delay. The error existed from the beginning (V2.1.00)!

− Bugfix: after a reset in the state 'Tuned(n.k.)' the Uref retriggering was not executed anymore.