



GE VERNONA

# MiCOM P40 Agile

## P345

### Version History

Hardware Version: M

Firmware Version: 91

Publication Reference: P345-VH-EN-4.1





## 1 HARDWARE AND SOFTWARE VERSION HISTORY

				Description of Changes	S1 Compatibility	Technical Documentation
S/W Version Major	S/W Version Minor	H/W Version	Original Date of Issue			
01	A	A	October 1999	Original issue.	V1.09 or Later	TG8614A
01	B	A	December 1999	<ul style="list-style-type: none"> <li>Corrected 90 degree phase angle displacement in measurement of Ia, Ib, Ic</li> <li>Corrected RTD temperature and invalid system frequency measurements in MODBUS fault records</li> <li>Corrected VT scaling factors for Va, Vb, Vc in fault records</li> <li>Minor bug fixes</li> </ul>	V1.09 or Later	TG8614A
01	C	A	March 2000	<ul style="list-style-type: none"> <li>Trip LED status saved during power cycling</li> <li>Corrections to omission of fault duration and CB operating time in fault record</li> <li>Corrected -90 degree phase angle displacement in measurement of VN and VN derived</li> <li>Reset of alarms and indications event added to event record</li> <li>Minor bug fixes</li> </ul>	V1.09 or Later	TG8614A
02	A	A	October 2000	<ul style="list-style-type: none"> <li>DNP 3.0 protocol added</li> <li>Courier and MODBUS enhancements to improve compatibility with other protection (mainly PX20 products)</li> <li>Modifications to IEC60870-5-103 Test Mode</li> <li>Poledead logic DDB signals made visible in PSL</li> <li>Foreign Language text updated</li> <li>Active and reactive power added to MODBUS fault record</li> <li>Minor bug fixes</li> </ul>	V1.10 or Later	TG8614B
03	A	A	January 2001	<ul style="list-style-type: none"> <li>Event filtering added</li> <li>Correction to energy measurement inaccuracy</li> <li>Minor bug fixes</li> </ul>	V2.00 or Later	TG8614B
03	B	A	May 2001	<ul style="list-style-type: none"> <li>Correction to NPS Alarm operation</li> <li>Minor bug fixes</li> </ul>	V2.00 or Later	TG8614B
03	C	A	January 2002	<ul style="list-style-type: none"> <li>Resolved possible reboot caused by Disturbance Recorder</li> <li>Minor bug fixes</li> </ul>	V2.00 or Later	TG8614B
03	D	A	February 2002	<ul style="list-style-type: none"> <li>Resolved possible reboot caused by invalid MODBUS requests</li> <li>Minor bug fixes</li> </ul>	V2.00 or Later	TG8614B
03	E	A	December 2002	<ul style="list-style-type: none"> <li>DNP 3.0 Object 12 "CROB" implementation is now compliant for simple function points</li> <li>DNP 3.0 Object 10 included in Class 0 poll</li> <li>DNP 3.0 support for season in time information</li> <li>Correction to MODBUS CB Trip and Close via "G" command</li> </ul>	V2.00 or Later	TG8614B

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
03	E	A	December 2002	<ul style="list-style-type: none"> <li>Change to neutral voltage displacement protection and directional SEF protection so that they are not blocked by the VT supervision logic when the VN input and ISEF&gt;VNPol are selected as Measured</li> <li>Correction to undervoltage stage 2 (V&lt;2) setting range. The setting range has been increased from 10-70V to 10-120V (Vn=110/120V) so that it is the same as V&lt;1</li> <li>Correction to VT ratio scaling problem in the disturbance recorder</li> <li>Improvement to the RTD start-up calibration routine</li> <li>Minor bug fixes</li> </ul>	V2.00 or Later	TG8614B
03	F	A	March 2004	<ul style="list-style-type: none"> <li>Improvement to the differential protection performance at low frequencies</li> <li>Correction to the fault recorder window for current based trips so that it can terminate properly once the FAULT_REC(TRIG signal (DB2 288) is reset. Previously it needed to wait for Relay_3 to reset also before termination</li> <li>Power measurement limits added to prevent non-zero values with no current and voltage. Also, power factor measurements are limited to +/-1</li> <li>Resolved possible reboot caused by failure to time sync. from DNP 3.0 when IRIG-B is active which is also providing the time sync. Now, any failure of the DNP 3.0 to time sync. will only produce a maintenance record</li> <li>Correction to French, German and Spanish language menu text for generator differential (S2 setting [3004] which incorrectly refers to the setting as S1.</li> <li>Resolved possible problem with disturbance recorder triggering which could cause loss of disturbance record data, temporary freezing of the user interface or loss of rear port communications</li> <li>Resolved unreliable MODBUS framing</li> <li>Resolved creation of spurious password expired event when menu cell or MODBUS register is accessed</li> <li>Resolved error code 0x8D840000</li> <li>Minor bug fixes</li> </ul>	V2.00 or Later	TG8614B
03	G	A	June 2004	<ul style="list-style-type: none"> <li>For Courier/DNP 3.0/IEC60870-5-103 builds only</li> <li>Correction to parity setting for MODBUS and DNP 3.0 when the relay is powered up</li> <li>Improvement to the self-checking of the analog channels and SRAM</li> <li>Minor bug fixes</li> </ul>	V2.00 or Later	TG8614B
03	H	A	July 2004	<ul style="list-style-type: none"> <li>For MODBUS builds only</li> <li>Changes as for G</li> <li>Improvement to the MODBUS driver to cope better with spurious data transmissions and failures of the relay to respond to commands where the server response time is fast</li> <li>Minor bug fixes</li> </ul>	V2.00 or Later	TG8614B

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
03	J	A	June 2005	<ul style="list-style-type: none"> <li>Correction to the alarm and trip indication of the faulted phase(s) for the second stage of the undervoltage and overvoltage protection in the fault record information on the relay LCD</li> <li>Correction to false frequency protection start at power-up</li> <li>MODBUS driver modified to prevent relay reboot with error code 0x8C810000 in hardware A/B/C relays for 60Hz applications where fast polling and high baud rates are used</li> <li>Modification to prevent reboot when large number of control and settings are sent to relay in quick succession over DNP 3.0</li> <li>Minor bug fixes</li> </ul>	V2.00 or Later	TG8614B
04	A	A	June 2001	<ul style="list-style-type: none"> <li>Not released to production</li> <li>Pole slipping and sensitive reverse power added</li> <li>100% stator earth fault protection enhancements. W/VAr/VAr inhibit elements added to 3rd harmonic undervoltage protection and 3rd harmonic overvoltage protection added</li> <li>Neutral voltage displacement threshold, <math>VN&gt;1/2</math>, increased from 50 to 80 V (<math>Vn=100/120</math> V), 200 to 320 V (<math>Vn=380/480</math> V)</li> <li>Earth fault polarizing voltage threshold, VnPol, increased from 22 to 88 V (<math>Vn=100/120</math> V) and 88 to 352 V (<math>Vn=380/480</math> V)</li> <li>Cos phi and sin phi features added to SEF protection</li> <li>Minor bug fixes</li> </ul>	V2.01 or Later	TG8614B
04	B	A	July 2001	<ul style="list-style-type: none"> <li>Not released to production</li> <li>Minor bug fix to background self-check diagnostics introduced in 04A</li> </ul>	V2.01 or Later	TG8614B
04	C	A	December 2001	<ul style="list-style-type: none"> <li>Correction to Courier NPS thermal reset command</li> <li>Minor bug fixes</li> </ul>	V2.01 or Later	TG8614B
04	D	A	January 2002	<ul style="list-style-type: none"> <li>Resolved possible reboot caused by Disturbance Recorder</li> <li>Minor bug fixes</li> </ul>	V2.01 or Later	TG8614B
04	E	A	February 2002	<ul style="list-style-type: none"> <li>Resolved possible reboot caused by invalid MODBUS requests</li> <li>Minor bug fixes</li> </ul>	V2.01 or Later	TG8614B
04	F	A		<ul style="list-style-type: none"> <li>Enhanced DNP 3.0 Object 10 support for Pulse On/Close control points</li> <li>DNP 3.0 Object 10 included in Class 0 poll</li> <li>DNP 3.0 support for season in time information</li> <li>Correction to MODBUS CB Trip and Close via "0" command</li> <li>Change to neutral voltage displacement protection and directional SEF protection so that they are not blocked by the VT supervision logic when the VN Input and ISEF&gt;VNPol are selected as Measured</li> <li>Correction to undervoltage stage 2 (<math>V&lt;2</math>) setting range. The setting range has been increased from 10-70 V to 10-120 V (<math>Vn=110/120</math> V) so that it is the same as <math>V&lt;1</math></li> <li>Correction to VT ratio scaling problem in the disturbance recorder</li> </ul>	V2.01 or Later	TG8614B

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
				<ul style="list-style-type: none"> <li>Improvement to the RTD start-up calibration routine</li> <li>Minor bug fixes</li> </ul>		
04	G	A		<ul style="list-style-type: none"> <li>Improvement to the differential protection performance at low frequencies</li> <li>Correction to the fault recorder window for current based trips so that it can terminate properly once the FAULT_REC_TRIGGER signal (DDB 288) is reset. Previously it needed to wait for Relay 3 to reset also before termination</li> <li>Power measurement limits added to prevent non-zero values with no current and voltage. Also, power factor measurements limited to +/-1</li> <li>Resolved possible reboot caused by failure to time sync. from DNP 3.0 when IRIG-B is active which is also providing the time sync. Now, any failure of the DNP 3.0 to time sync. will only produce a maintenance record</li> <li>Correction to French, German and Spanish language menu text for generator differential IS2 setting [3004] which incorrectly refers to the setting as IS1</li> <li>Resolved possible problem with disturbance recorder triggering which could cause loss of disturbance record data, temporary freezing of the user interface or loss of rear port communications</li> <li>Resolved unreliable MODBUS framing</li> <li>Resolved creation of spurious password expired event when menu cell or MODBUS register is accessed</li> <li>Resolved error code 0x8D840000</li> <li>Minor bug fixes</li> </ul>	V2.01 or Later	TG8614B
04	(1) G	A	March 2004	<ul style="list-style-type: none"> <li>Changes are the same as 04G</li> <li>Special for Powerformer stuck pole breaker fail application where the neutral voltage displacement setting range has been increased from 80 to 200 V (Vn-100/V20 V)</li> <li>MODBUS build only</li> </ul>	V2.01 or Later	TG8614B
04	H	A	June 2004	<ul style="list-style-type: none"> <li>For Courier/DNP 3.0/IEC60870-5-103 builds only</li> <li>Correction to parity setting for MODBUS and DNP 3.0 when the relay is powered up</li> <li>Improvement to the self-checking of the analog channels and SRAM</li> </ul>	V2.01 or Later	TG8614B
04	J	A	July 2004	<ul style="list-style-type: none"> <li>For MODBUS builds only</li> <li>Changes as for H</li> <li>Improvement to the MODBUS driver to cope better with spurious data transmissions and failures of the relay to respond to commands where the server response time is fast</li> <li>Minor bug fixes</li> </ul>	V2.01 or Later	TG8614B
04	K	A	June 2005	<ul style="list-style-type: none"> <li>Changes are the same as 03J</li> </ul>	V2.01 or Later	TG8614B
05	A	A/B	September 2001	<ul style="list-style-type: none"> <li>Not released to production</li> <li>Thermal overload protection added</li> <li>Additional stage of under-impedance protection</li> <li>Control inputs added</li> </ul>	V2.05 or Later	P34x/EN T/C11

S/W Version Major	S/W Version Minor	H/W Version	Original Date of Issue	Description of Changes	S1 Compatibility	Technical Documentation
05	A	A/B	September 2001	<ul style="list-style-type: none"> <li>PSL DDB list of signals increased from 512 to 1023 signals</li> <li>PSL Data menu added with PSL Reference information for version history</li> <li>Optional additional opto inputs and output contacts with a larger case size option available</li> <li>New 'Universal' wide ranging opto inputs (Model number hardware suffix changed to B)</li> <li>New output contacts with better break and continuous carry ratings (Model number hardware suffix changed to B)</li> <li>Minor bug fixes</li> <li>Courier and MODBUS builds only</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	B	A/B	October 2001	<ul style="list-style-type: none"> <li>Not released to production</li> <li>Correction to VT ratio scaling problem in the disturbance recorder</li> <li>Minor bug fixes</li> <li>Courier and MODBUS builds only</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	1 (C)	A/B	August 2000	<ul style="list-style-type: none"> <li>IEC60870-5-103 build with special private code mapping for ALSTOM Power project in Iceland. Includes private codes and uncompressed disturbance recorder</li> <li>Resolved possible reboot caused by Disturbance Recorder</li> <li>Minor bug fixes</li> <li>IEC60870-5-103 build only</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	D	A/B	February 2002	<ul style="list-style-type: none"> <li>Resolved possible reboot caused by Disturbance Recorder</li> <li>Resolved possible reboot caused by invalid MODBUS requests</li> <li>Enhancements to IEC 60870-5-103 build to include private codes, monitor blocking and disturbance record extraction. New uncompressed disturbance recorder for IEC 60870-5-103 build only</li> <li>Correction to Courier NPS thermal reset command</li> <li>Correction to IEC 60870-5-103 voltage measurements for Vn=380/480 V relays</li> <li>Minor bug fixes</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	E	A/B	March 2002	<ul style="list-style-type: none"> <li>Correction to foreign language text for System Backup protection not included in previous 05 software builds</li> <li>Minor bug fixes</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	F	A/B	October 2002	<ul style="list-style-type: none"> <li>DNP 3.0 Object 12 "CROB" implementation is now compliant for simple function points</li> <li>Correction to MODBUS CB Trip and Close via "0" command</li> <li>Change to neutral voltage displacement protection and directional SEF protection so that they are not blocked by the VT supervision logic when the VN Input and ISEF&gt;VNPol are selected as Measured</li> <li>Correction to undervoltage stage 2 (<math>V&lt;2</math>) setting range. The setting range has been increased from 10-70 V to 10-120 V (<math>Vn=110/120</math> V) so that it is the same as <math>V&lt;1</math></li> <li>Improvement to the RTD start-up calibration routine</li> </ul>	V2.05 or Later	P34x/EN T/C11

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
05	F	A/B	October 2002	<ul style="list-style-type: none"> <li>IEC60870-5-103 build with special private code mapping for ALSTOM Power project in Iceland. Includes private codes and uncompressed disturbance recorder</li> <li>Correction to IEC60870-5-103 voltage measurements for Vn=380/480 V relays</li> <li>Correction to foreign language text for System Backup protection not included in previous 05 software builds</li> <li>Change to neutral voltage displacement protection and directional SEF protection so that they are not blocked by the VT supervision logic when the VN Input and ISEF&gt;VNPol are selected as Measured</li> <li>Improvement to the RTD start-up calibration routine</li> <li>Minor bug fixes</li> <li>IEC60870-5-103 build only</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	1 (F)	A/B	October 2002	<ul style="list-style-type: none"> <li>Control input states added to non-volatile memory</li> <li>German language text updated</li> <li>Power measurement limits added to prevent non-zero values with no current and voltage. Also, power factor measurements are limited to +/-1</li> <li>In the Commissioning Test menu, the DDB status has been made visible on the front panel display</li> <li>Support for Trip LED Status and Alarm Status added to G26 data type for MODBUS register 30001</li> <li>Correction to the CB tripClose functionality via MODBUS so that local/remote setting in the CB Control menu is not ignored</li> <li>Correction to MODBUS auto event extraction which does not work correctly</li> <li>DNP 3.0 Object 12 "CROB" implementation is now compliant for simple function points</li> <li>DNP 3.0 object 10 added to class 0 poll</li> <li>Correction to DNP 3.0 time sync. operation so that it does not modify the season bit in the time stamp</li> <li>Improvement to the differential protection performance at low frequencies</li> <li>Correction to the manual reset user alarms so that the event record shows the alarm turning off only when a reset command has been issued. Previously the "alarm off" event is produced once the initiating signal is removed</li> <li>Correction to the fault recorder window for current based trips so that it can terminate properly once the FAULT_REC_TRIGGER signal (DDB 288) is reset. Previously it needed to wait for Relay 3 to reset also before termination</li> <li>DDB 649 for pole slip reactance line start removed from the event list</li> <li>Resolved possible reboot caused by failure to time sync. from DNP 3.0 when IRIG-B is active which is also providing the time sync. Now, any failure of the DNP 3.0 to time sync. will only produce a maintenance record</li> <li>Correction to French, German and Spanish language menu text for generator differential I/S2 setting [3004] which incorrectly refers to the setting as I/S1</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	G	A/B	March 2004		V2.05 or Later	P34x/EN T/C11

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
05	G	A/B	March 2004	<ul style="list-style-type: none"> <li>Correction to the alarm and trip indication of the faulted phase(s) for the second stage of the undervoltage and overvoltage protection in the fault record information on the relay LCD</li> <li>Correction to the C32CS error when extracting and saving an uncompressed disturbance record from the P34x through the front port using MiCOM S1 Studio. This only applies to P34x IEC60870-5-103 protocol builds since this is the only communication option that supports uncompressed disturbance records. The error is caused by unavailable opto inputs or relay contacts being assigned to digital inputs in the Disturbance Recorder menu</li> <li>Resolved possible problem with disturbance recorder triggering which could cause loss of disturbance record data, temporary freezing of the user interface or loss of rear port communications</li> <li>Resolved unreliable MODBUS framing</li> <li>Resolved creation of spurious password expired event when menu cell or MODBUS register is accessed</li> <li>Resolved error code 0x8D840000</li> <li>Minor bug fixes</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	H	A/B	June 2004	<ul style="list-style-type: none"> <li>For Courier/DNP 3.0/IEC60870-5-103 builds only</li> <li>Correction to parity setting for MODBUS and DNP 3.0 when the relay is powered up</li> <li>Improvement to the self-checking of the analog channels and SRAM</li> <li>Minor bug fixes</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	J	A/B	June 2004	<ul style="list-style-type: none"> <li>For MODBUS builds only</li> <li>Changes as for H</li> <li>Improvement to the MODBUS driver to cope better with spurious data transmissions and failures of the relay to respond to commands where the server response time is fast</li> <li>Minor bug fixes</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	K	A/B	June 2005	<ul style="list-style-type: none"> <li>MODBUS Time Transmission Format selectable via MODBUS only setting as Standard or Reverse for transmission of byte order</li> <li>V/HZ Protection drop-off/pick-up (DO/PU) ratio changed from 95% to 98%</li> <li>DO/PU ratio changed from 95% to 98% for Over/Under Voltage protection. Trip threshold changed from 1.05, 0.95 Vs to 1 Vs for Over and Under Voltage and NVD protection. TMS setting of Under/Over Voltage protection reduced from 0.5 to 0.05.</li> <li>Correction to false frequency protection start at power-up</li> <li>MODBUS driver modified to prevent relay reboot with error code 0x8C810000 in hardware A/B/C relays for 60Hz applications where fast polling and high baud rates are used</li> <li>Modification to prevent reboot when large number of control and settings are sent to relay in quick succession over DNP 3.0</li> <li>IEC60870-5-103. Status of summer bit now works correctly in time sync.</li> </ul>	V2.05 or Later	P34x/EN T/C11

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
05	K	A/B	June 2005	<ul style="list-style-type: none"> <li>Correction to DNP 3.0 software where settings download from MICO M S1 Studio can fail for relays that have model dependent I/O configurations</li> <li>Minor bug fixes</li> </ul>	V2.05 or Later	P34x/EN T/C11
05	L	A/C	July 2007	<ul style="list-style-type: none"> <li>Correction to menu cell addressing for 05K. Version 05K software was built from S1 software to incorporate latest bug fixes. In doing this build of the 05K software the menu cell addressing changes that are in 06 software were included. These mainly affect the cell addresses of functions which have IDMT characteristics. The result is the default S1 files for 05 software are not compatible with a relay with 05K software. The 05L software fixes this problem so now the default S1 files for 05 software are compatible with a relay with 05L software.</li> <li>Minor bug fixes</li> </ul>	V2.05 or Later	P34x/EN T/C11
06	A	A/C	August 2000	<ul style="list-style-type: none"> <li>Not released to production</li> <li>Additional IDMT characteristics for overcurrent and voltage dependent overcurrent protection (rectifier and RI curve), earth fault protection (RI and IDG curve) and sensitive earth fault protection (IDG curve)</li> <li>Change to time dial setting range of IEEE and US curves. Previously curves were based on TD7 where TD = 0.5-15. Now, curves are based on TD where TD = 0.01-100. Also, includes change to US ST Inverse (C02) curve. K constant and L constant multiplied x 7 because of change to TD, now K=0.16758 and L=0.11858</li> <li>Angle measurements for sequence quantities in Measurements 1 menu added</li> <li>Interturn protection added</li> <li>Optional 2nd rear communication port added</li> <li>New power supply with increased output rating and reduced dc inrush current (typically &lt; 10A). (Model number hardware changed to suffix C)</li> <li>Wider setting range for Power and Sensitive Power protection. P&gt;1/2 (reverse power) and P&lt;1/2 (low forward power) maximum setting changed from 40 ln to 300 ln W (Vn=100/120 V) and from 160 ln W (Vn=380/480 V). Sen. -P&gt;1/2 and Sen. P&lt;1/2 maximum setting changed from 15 ln to 100 ln W (Vn=100/120 V) and from 60 ln to 400 ln W (Vn=380/480 V). There is also an additional setting for the Power and Sensitive Power protection to select the Operating mode as Generating or Motoring</li> <li>Wider setting range for the voltage dependent overcurrent protection. Volt Dep. OC V&lt;1 and V&lt;2 minimum setting changed from 20 to 5 V (Vn=100/120 V) and from 80 to 20 V (Vn=380/480 V). V Dep. OC k Set minimum setting changed from 0.25 to 0.1</li> <li>Maximum overfrequency protection setting increased from 65 to 68 Hz</li> <li>Change to undervoltage stage 2 (V&lt;2) setting range to correct an error. The setting range has been increased from 10-70 V to 10-120 V (Vn=100/120 V) so that it is the same as V&lt;1</li> <li>Change to neutral voltage displacement protection and directional SEF protection so that they are now not blocked by the voltage transformer supervision logic when the VN Input and ISEF&gt; VN Pol are selected as Measured</li> </ul>	V2.06 or Later	P34x/EN T/D22

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06	A	A/C	August 2000	<ul style="list-style-type: none"> <li>Includes all the improvements and corrections in 05F software except for 2</li> <li>enhancements shown for 06B</li> <li>Minor bug fixes</li> </ul>	V2.06 or Later	P34x/EN T/D22
06	B	A/C	October 2002	<ul style="list-style-type: none"> <li>Correction to undervoltage stage 2 (V&lt;2) setting range. The setting range has been increased from 10-70 V to 10-120 V (Vn=110/120 V) so that it is the same as V&lt;1</li> <li>Enhancements to IEC60870-5-103 build to include private codes, monitor blocking and disturbance record extraction. New uncompressed disturbance recorder for IEC60870-5-103 build only</li> <li>Improvement to the RTD start-up calibration routine</li> <li>Minor bug fixes</li> </ul>	V2.06 or Later	P34x/EN T/D22
06	C	A/C	March 2004	<ul style="list-style-type: none"> <li>Changes are the same as 05G</li> </ul>	V2.06 or Later	P34x/EN T/D22
06	D	A/C	June 2004	<ul style="list-style-type: none"> <li>For Courier/DNP 3.0/IEC60870-5-103 builds only</li> <li>Correction to parity setting for MODBUS and DNP 3.0 when the relay is powered up</li> <li>Improvement to the self-checking of the analogue channels and SRAM</li> <li>Minor bug fixes</li> </ul>	V2.06 or Later	P34x/EN T/D22
06	E	A/C	July 2004	<ul style="list-style-type: none"> <li>For MODBUS builds only</li> <li>Changes as for D</li> <li>Improvement to the MODBUS driver to cope better with spurious data transmissions and failures of the relay to respond to commands where the server response time is fast</li> <li>Minor bug fixes</li> </ul>	V2.06 or Later	P34x/EN T/D22
06	F	A/C	June 2005	<ul style="list-style-type: none"> <li>Changes are the same as 05K</li> <li>This release is specific for Hydro Quebec (HQ) to provide a P343 relay with modified single phase sensitive power protection which uses B Phase to calculate sensitive power as opposed to A-Phase in the standard software versions</li> </ul>	V2.06 or Later	P34x/EN T/D22
06	G	A/C	July 2009	<ul style="list-style-type: none"> <li>Not released to production</li> <li>Optional additional 4 analog inputs and 4 outputs (current loop inputs and outputs -CLIO)</li> <li>Additional setting to select the current inputs (IA-1, IB-1, IC-1 or IA-2, IB-2, IC-2) used for the breaker fail undercurrent</li> <li>Two new hardware configurations - (1) 32 Inputs, 16 Outputs, RTD, CLIO (2) 16 Inputs, 32 Outputs, RTD, CLIO</li> <li>Number of alarms increased from 64 to 96 (New Alarm Status 3 word - 32 bit)</li> <li>Additional user alarms. Previously 1 manual reset and 2 self-reset user alarms, now 12 manual reset and 4 self-reset user alarms</li> <li>Control Input states added to non-volatile memory</li> <li>German language text updated</li> <li>Courier and MODBUS builds only</li> </ul>	V2.09 or Later	P34x/EN T/E33 (ALSTOM) or P34x/EN T/F33 (AREVA)
07	A	A/C	April 2003			

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation	
07	A	A/C	April 2003	<ul style="list-style-type: none"> <li>Minor bug fixes</li> </ul>	V2.09 or Later	P34x/EN T/E33 (ALSTOM) or P34x/EN T/F33 (AREVA)	
07	B	A/C	October 2003	<ul style="list-style-type: none"> <li>Power measurement limits added to prevent non-zero values with no current and voltage. Also, power factor measurements are limited to +/-1</li> <li>In the Commissioning Test menu, the DDB status has been made visible on the front panel display</li> <li>Support for Trip LED Status and Alarm Status added to G26 data type for MODBUS register 30001</li> <li>Correction to the CB trip/Close functionality via MODBUS so that local/remote setting in the CB Control menu is not ignored</li> <li>Correction to MODBUS auto event extraction which does not work correctly in versions 05 and 06 software</li> <li>Extension of the control input functionality to support pulse and batch operations in DNP3.0</li> <li>DNP 3.0 object 10 added to class 0 poll</li> <li>Correction to DNP 3.0 time sync. operation so that it does not modify the season bit in the time stamp</li> <li>Improvement to the differential protection performance at low frequencies</li> <li>Correction to the manual reset user alarms so that the event record shows the alarm turning off only when a reset command has been issued. Previously the "alarm off" event is produced once the initiating signal is removed</li> <li>Correction to the fault recorder window for current based trips so that it can terminate properly once the FAULT_REC_TRIG signal (DDB 288) is reset. Previously it needed to wait for Relay 3 to reset also before termination</li> <li>DDB 649 for pole slip reactance line start removed from the event list</li> <li>Minor bug fixes</li> </ul>	V2.09 or Later	P34x/EN T/E33 (ALSTOM) or P34x/EN T/F33 (AREVA)	
07	C	A/C	March 2004		<ul style="list-style-type: none"> <li>Resolved possible reboot caused by failure to time sync. from DNP 3.0 when IRIG-B is active which is also providing the time sync. Now, any failure of the DNP 3.0 to time sync. will only produce a maintenance record</li> <li>Correction to French, German and Spanish language menu text for generator differential (S2) setting [3004] which incorrectly refers to the setting as S1</li> <li>Correction to the alarm and trip indication of the faulted phase(s) for the second stage of the undervoltage and overvoltage protection in the fault record information on the relay LCD</li> <li>Correction to the C32CS error when extracting and saving an uncompressed disturbance record from the P34x through the front port using MICOM S1 Studio. This only applies to P34x IEC60870-5-103 protocol builds since this is the only communication option that supports uncompressed disturbance records. The error is caused by unavailable opto inputs or relay contacts being assigned to digital inputs in the Disturbance Recorder menu</li> </ul>	V2.09 or Later	P34x/EN T/E33 (ALSTOM) or P34x/EN T/F33 (AREVA)

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
07	C	A/C	March 2004	<ul style="list-style-type: none"> <li>Resolved possible problem with disturbance recorder triggering which could cause loss of disturbance record data, temporary freezing of the user interface or loss of rear port communications</li> <li>Resolved unreliable MODBUS framing</li> <li>Resolved error code 0x8D840000</li> <li>Minor bug fixes</li> </ul>	V2.09 or Later	P34x/EN T/E33 (ALSTOM) or P34x/EN T/F33 (AREVA)
07	D	A/C	June 2004	<ul style="list-style-type: none"> <li>For Courier/DNP 3.0/IEC60870-5-103 builds only           <ul style="list-style-type: none"> <li>Correction to parity setting for MODBUS and DNP 3.0 when the relay is powered up</li> <li>Improvement to the self-checking of the analog channels and SRAM</li> <li>Minor bug fixes</li> </ul> </li> </ul>	V2.09 or Later	P34x/EN T/E33 (ALSTOM) or P34x/EN T/F33 (AREVA)
07	E	A/C	July 2004	<ul style="list-style-type: none"> <li>For MODBUS builds only           <ul style="list-style-type: none"> <li>Changes as for D</li> <li>Improvement to the MODBUS driver to cope better with spurious data transmissions and failures of the relay to respond to commands where the server response time is fast</li> <li>Minor bug fixes</li> </ul> </li> </ul>	V2.09 or Later	P34x/EN T/E33 (ALSTOM) or P34x/EN T/F33 (AREVA)
07	F	A/C	June 2005	<ul style="list-style-type: none"> <li>Changes are the same as 05K</li> </ul>	V2.09 or Later	P34x/EN T/E33 (ALSTOM) or P34x/EN T/F33 (AREVA)
30	A	J	November 2004	<ul style="list-style-type: none"> <li>Not released to production</li> <li>Enhanced main processor board</li> <li>Company name change. 'ALSTOM' changed to 'MICOM' in default Plant Reference cell and 'ALSTOM P' changed to 'MICOM P' for ASDU5 message type, IEC protocol</li> <li>User interface enhancements - larger 100x33 pixel graphical display of 3 lines x 16 characters + 2 new buttons, direct access keys</li> <li>Labels added, disturbance recorder trigger from control inputs</li> <li>Control input enhancements. Selection of latched or pulsed mode, control input</li> <li>16 PSL Timers (previously 8)</li> <li>Platform alarms mapped to the DDB (Alarm Status 3)</li> <li>Time synchronization using an opto input</li> <li>Opto input power frequency filter control, enabled/disabled</li> <li>Courier over EIA/RS485 can be selected for the 1st rear port in addition to existing K-Bus configuration</li> <li>Transmission of the first rear port protocols (MODBUS/Courier/DNP3.0) using the fiber-optic port (IEC60870-5-103 previously available)</li> <li>Uncompressed disturbance recording added for Courier/MODBUS/DNP 3.0 (added to IEC60870-5-103 protocol in 05D, 06B software)</li> <li>Dual Characteristic DO/PU ratio Opto Inputs (DO/PU = 60/80% or 50/70%)</li> </ul>	V2.11 or Later	P34x/EN M/G44

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30	A	J	November 2004	<ul style="list-style-type: none"> <li>512 Event records (previously 250)</li> <li>DNP3 evolution. Scan interval for binary inputs (object 01) reduced from 5s to 0.5s. Scan interval for analog inputs (object 30) reduced from 2s to 1s. Improved minimum step size of analog input dead bands</li> <li>MODBUS Time Transmission Format selectable as Standard or Reverse for transmission of byte order</li> <li>V/Hz Protection drop-off/pick-up (DO/PU) ratio changed from 95% to 98%</li> <li>DO/PU ratio changed from 95% to 98% for Over/Under Voltage protection. Trip threshold changed from 1.05, 0.95 Vs to 1 Vs for Over and Under Voltage and NVD protection. TMS setting of Under/Over Voltage protection reduced from 0.5 to 0.05</li> <li>CT Supervision for 2nd set of 3 phase CTs. Previously only I/A/I/B/I/C inputs supervised</li> <li>Default labels changed for the digital inputs and outputs in Input Labels and Output Labels menu. Changed to be more generic - Input Lx, Output Rx</li> <li>Correction to false frequency protection start at power-up</li> <li>IEC60870-5-103. Status of summer bit now works correctly in time sync command</li> <li>Minor bug fixes</li> </ul>	V2.11 or Later	P34x/EN M/G44
30	B	J	December 2004	<ul style="list-style-type: none"> <li>Modification to prevent reboot when large number of control and settings are sent to relay in quick succession over DNP 3.0</li> <li>Correction to 2nd rear comms. port channel failure for P34xxxxxxxxxJ relays only</li> <li>Minor bug fixes</li> </ul>	V2.11 or Later	P34x/EN M/G44
31	A	J	April 2005	<ul style="list-style-type: none"> <li>New relay model available, the P344 (80TE case only). The P344 is based on the P343 but has an additional neutral voltage input, VN2, to provide 2 measured neutral voltage protection functions (59N) for earth fault and interturn protection</li> <li>4 stages of directional overcurrent protection (67). Previous P342/3/4 software versions included 2 stages of non-directional overcurrent protection</li> <li>1 stage of definite time negative phase sequence overpower protection (S2=12xV2)/32NPS). This is used in China as an interlocking signal for the neutral voltage interturn protection</li> <li>Independent derived/measured neutral voltage protection (59N). P341/2/3 has 2 stages of measured and 2 stages of derived neutral voltage protection</li> <li>P344 has 2 measured neutral voltage inputs and so has 2x2 stages of measured and 2 stages of derived neutral voltage protection. Previous software versions included 2 stages of measured or derived neutral voltage protection</li> <li>6 bands of generator abnormal frequency protection (81AB). Similar to P94x 81AB function</li> <li>1 definite time stage of negative phase sequence overvoltage protection (47).</li> <li>Same as P14x (47) function</li> <li>4 definite time stages of negative phase sequence overcurrent protection (46OC).</li> <li>Same as P14x (46OC) function</li> </ul>	V2.11 or Later	P34x/EN M/G44

SW Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
31	A	J	April 2005	<ul style="list-style-type: none"> <li>P342/3 minimum three phase power settings reduced to 0.5%Pn, previously 2%Pn. P344 3 phase power setting range is as new P343 setting range</li> <li>3 additional definite time delayed overfluxing protection stages. The inverse time overfluxing characteristic has been modified to make it more consistent with competitors and to aid future enhancements. The overfluxing protection now comprises of 1 definite time alarm + 1 inverse/DT trip stage + 3 definite time trip stages</li> <li>Correction to DNP 3.0 software where settings download from MICOM S1 Studio can fail for relays that have model dependent I/O configurations</li> <li>Minor bug fixes</li> </ul>	V2.11 or Later	P34x/EN M/G44
32	A	J	March 2006	<ul style="list-style-type: none"> <li>Not released to production</li> <li>Phase rotation function added. Can select phase rotation as ABC or ACB for all 3 phase current and voltage inputs. Can also individually select which 2 phases are swapped for any of the 3 phase current and voltage inputs. New menu column 'System Config' with phase rotation settings. 'Gen Diff' menu column moved to make way for 'System Config' menu</li> <li>In the disturbance recorder the maximum number of analogue channels that can be recorded is increased so that all analogue inputs can be recorded. Number of analogue channels is increased from 8 to 9/12/13 for P342/3/4</li> <li>Number of PSL DDB signals increased from 10/23 to 14/08 and DDBs re-organized. This means that the PSL created in version 32 software is not compatible to PSL created in previous software versions and vice versa</li> <li>Setting Group selection via 2 new DDB signals makes it possible to select a setting group via any opto input or remotely via a Control Input. Previously, the 4 setting groups could be selected using fixed opto inputs, 1 and 2</li> <li>An 'Any Trip' DDB has been created to allow any contact(s) to be used as the trip indication. Previously, the Any Trip signal was defined as operation of Relay contact 3. The Any Trip signal operates the Trip LED, initiates the breaker fail logic and maintenance counters and is used in the fault recorder logic</li> <li>Minor changes to description of CT and VT Ratio settings</li> <li>Number of maintenance records increased from 5 to 10</li> <li>Inter frame gap added between frames in multi-frame transmission of DNP 3.0 messages to be compatible with C284</li> <li>Correction to error in NP S directional overcurrent operating time delay. The excess in the operating time (always less than 1s) only occurs when set to directional</li> <li>Correction to intermittent incorrect IIG-B status indication of 'Card Failed' with healthy IIG-B source</li> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/G44 P34x/EN AD/G54
32	B	J	May 2006	<ul style="list-style-type: none"> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/G44 P34x/EN AD/G54

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
32	C	J	October 2006	<ul style="list-style-type: none"> <li>New P345 relay model. The P345 includes the same functions as the P344 plus 100% stator earth fault protection via low frequency injection. The P345 also includes a new front panel with 10 function keys and 10 associated programmable LEDs. All 18 of the P345 programmable LEDs are tri-color and can be set as red, yellow or green in the PSL. P345 not released to production.</li> <li>MODBUS allows individual 16 bit register pairs that make up 32 bit data to be accessed individually.</li> <li>Correction to fast operation of overcurrent protection with IEEE/US inverse time reset characteristic.</li> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/H65
32	D	J	December 2006	<ul style="list-style-type: none"> <li>Correction to P34x Directional Sensitive Earth Fault (Forward or reverse) function. Function does not operate if SEF/REF Protection is initially disabled in the configuration column and SEF Mode is set to 'SEF' (default setting) when the relay is booted up. Correct operation will only occur when the SEF Mode setting is changed (submitted) and changed back to 'SEF' or the relay is rebooted with SEF/REF enabled in the configuration column.</li> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/H65
32	E	J	April 2007	<ul style="list-style-type: none"> <li>P343 IEC61850 added. IEC61850 not released to production.</li> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/H65
32	F	J/K	May 2007	<ul style="list-style-type: none"> <li>New P345 relay model released to production. The P345 includes the same functions as the P344 plus 100% stator earth fault protection via low frequency injection. The P345 also includes a new front panel with 10 function keys and 10 associated programmable LEDs. All 18 of the P345 programmable LEDs are tri-color and can be set as red, yellow or green in the PSL.</li> <li>Improvement made to 100% stator earth fault (64S) measurement algorithm to improve accuracy. '64S Series X' setting removed and new '64S Fail' DDB (1076) added.</li> <li>Correction to VT secondary ratio setting for 32 software relays, <math>V_n = 380/480</math> V rating. With a 1:1 VT ratio on a 380/480 V P340 relay with 32 software installed after power up the analogue quantities are 4 times too large. The error is corrected by re-applying the VT secondary (which is showing the correct value) setting.</li> <li>Local time zone adjustments for daylight saving time added to Date and Time menu.</li> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/H65
32	G	J/K	September 2007	<ul style="list-style-type: none"> <li>Correction to CT secondary ratio setting for 32F software relays. When relay is powered off and on the secondary CT ratio is applied incorrectly for a 5A rating such that currents measured are 5 times too small. CT ratio is applied correctly if settings re-applied when relay is powered on.</li> <li>Correction to incorrect year being set when date and time is set via the user interface with IRIG-B active.</li> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/H65

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32	H	J/K	November 2007	<ul style="list-style-type: none"> <li>Correction to the CT ratio scaling for 32 software relays. If the CT ratio secondary settings are set to 5A and the relay rebooted, if the setting group is changed the CT secondary scaling reverts to 1A.</li> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/H65
32	J	J/K	December 2007	<ul style="list-style-type: none"> <li>IEC 61850 communications added.</li> <li>Support released for high break contacts and de-modulated IRIG-B in all P34x relays. P34x relays can be ordered with modulated or de-modulated IRIG-B and with 4 or 8 high break contacts depending on the model.</li> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/H65
32	K	J/K	May 2008	<ul style="list-style-type: none"> <li>Correction to VT ratio problem. The VT ratio, if modified, is reset back to default values when the P345 relay is rebooted. This in turn causes the measurements to effectively display 'secondary' quantities as it now has a 1:1 ratio.</li> <li>This problem does not affect protection operation because the relay operates on 'per unit' quantities, which are unchanged. The primary and secondary ratios are used to scale the measurements and settings for display, communication and recording.</li> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/H65
32	L	J/K	March 2009	<ul style="list-style-type: none"> <li>Correction to ISEF and IN Secondary CT ratio scaling incorrectly being applied if both not set to the same value (1A or 5A) - P341/2/3/4 not affected.</li> <li>Minor bug fixes</li> </ul>	V2.14 or Later	P34x/EN M/H65
32	M	J/K	March 2011	<ul style="list-style-type: none"> <li>Rebranding software to ALSTOM.</li> <li>Correction to Px4x which stops receiving (processing) GOOSE messages when managed Ethernet switch parameterised for VLAN.</li> </ul>	V2.14 or Later	P34x/EN M/H65
33	A	J/K	June 2008	<ul style="list-style-type: none"> <li>Rotor earth fault protection added to P342/3/4/5 when CLIO card is fitted. Rotor earth fault function also requires P391 low frequency injection, coupling and measurement unit.</li> <li>DNP 3.0 enhancements: configurable points table, default variations, SBO timeouts, integer scaling, floating point analogue values, disturbance record extraction, remote settable deadbands and class assignment, configurable message length and timeouts, data link confirmation, alias control inputs.</li> <li>Support for Russian language added. This is now an order option.</li> <li>PSL positional data is now downloaded to the relay with the logic so that when the PSL is extracted from the relay the positional data of signals etc is the same as when downloaded.</li> <li>Support for set/reset latches in the PSL added.</li> <li>Minor bug fixes</li> </ul>	V3.0 (Studio) or Later	P34x/EN M/J76
33	B	J/K	March 2009	<ul style="list-style-type: none"> <li>Correction to ISEF and IN Secondary CT ratio scaling incorrectly being applied if both not set to the same value (1A or 5A) - P345 only.</li> <li>Minor bug fixes</li> </ul>	V3.0 (Studio) or Later	P34x/EN M/J76

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33	C	J/K	June 2009	<ul style="list-style-type: none"> <li>Correction to Residual OV NVD protection where derived neutral voltage is used for all protection stages (<math>VN1&gt;1/2/3/4/5/6</math> instead of <math>VN&gt;1/2</math> (derived), <math>VN&gt;2/3</math> (<math>VN1</math> input, measured), <math>VN&gt;5/6</math> (<math>VN2</math> input, measured, P344/5 only)). This bug only affects 33B software.</li> <li>Minor bug fixes</li> </ul>	v3.0 (Studio) or Later	P34x/EN M/J76
33	D	J/K	February 2010	<ul style="list-style-type: none"> <li>Correction to several IEC61850 modelling issues for phase 1 of IEC 61850.           <ul style="list-style-type: none"> <li>(1) Correction to missing measurements (<math>VN1</math> Derived Mag/Angle, NPS Thermal, V/Hz) and incorrect sourcing in the P340 IEC 61850 Phase 1 data model implementation.</li> <li>(2) Correction to DDB signal status which is not available to 61850 model when events are configured to be filtered out.</li> <li>(3) Correction to some of the strings for the Data Attributes under the 'NamPit' Data Object under LLN0 (only) of some of the Logical Devices.</li> <li>Minor bug fixes</li> </ul> </li> </ul>	v3.0 (Studio) or Later	P34x/EN M/J76
33	E	J/K	March 2011	<ul style="list-style-type: none"> <li>Rebranding software to ALSTOM.</li> <li>Correction to Px4x which stops receiving (processing) GOOSE messages when managed Ethernet switch parameterised for VLAN.</li> <li>Redundant Ethernet port option (IEC61850)</li> <li>IEC 61850 Phase 3 enhancements: Controls - Direct Control, Direct Control with enhanced security, Select Before Operate (SBO) with enhanced security, Eight Buffered Report Control Blocks and sixteen Unbuffered Report Control Blocks, Configurable Data Sets, Published GOOSE messages, Uniqueness of control, Select Active Setting Group, Quality for GOOSE, Address List, Originator of Control, Energy measurements and Reset controls for demand and thermal measurements using the MMTR Logical Node, Unit multipliers for all measurements.</li> </ul>	v3.0 (Studio) or Later	P34x/EN M/J76
35	A	J/K	December 2009			P34x/EN AD/J86
35	B	J/K	November 2010	<ul style="list-style-type: none"> <li>Read Only Mode for remote communications ports added</li> <li>Correction to DDB signal status not being available to 61850 model when events are configured to be filtered out</li> <li>Correction to some of the strings for the IEC61850 Data Attributes under the 'NamPit' Data Object under LLN0 (only) of some of the Logical Devices</li> <li>Minor bug fixes</li> </ul>	v3.0 (Studio) or Later	P34x/EN AD/J86

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35	B	J/K	November 2010	<ul style="list-style-type: none"> <li>(5) IEC61850 buffered reporting stops working after a period of time when applying several faults to generate reports</li> <li>Minor bug fixes</li> </ul>	V3.0 (Studio) or Later	P34x/EN AD/J86
35	C	J/K	March 2011	<ul style="list-style-type: none"> <li>Rebranding software to ALSTOM.</li> <li>Correction to Px4x which stops receiving (processing) GOOSE messages when managed Ethernet switch parameterised for VLAN.</li> </ul>	V3.0 (Studio) or Later	P34x/EN AD/J86
36	B	J/K	July 2011	<ul style="list-style-type: none"> <li>New relay model, P346.</li> <li>P346 is the same as P342 + differential protection.</li> <li>Transformer Differential protection, Differential CT Supervision and Circuitry Fault Alarm functions added to P343/4/5/6.</li> <li>Transformer thermal overload and Loss of Life functions added, based on the IEEE Standard C57.91-1995.</li> <li>Transformers Through Fault monitoring added.</li> <li>Check synchronization and CB Control functions added.</li> <li>4 definite time stages of df/dt protection added.</li> <li>Selectable CT source - Ia-1/Ib-1/Ic-1 or Ia-2/Ib-2/Ic-2 for Overcurrent, NPS Overcurrent, Restricted Earth Fault, NPS Power and Dead Machine protection added.</li> <li>CT Polarity - Standard/Inverted added.</li> <li>Phase CT2 ratio added due to transformer differential protection (877) being added. In previous software there was only 1 Phase CT ratio setting for the 2 sets of phase CTs used for generator differential protection (87G). Phase CT primary setting increased to 30k.</li> <li>Low Impedance biased restricted earth fault protection improved by addition of transient bias to make more stable for through faults.</li> <li>Improved undercurrent detector algorithm for CB Fail protection added.</li> </ul>	V3.0 (Studio) or Later	P34x/EN M/I96
36	B	J/K	July 2011	<ul style="list-style-type: none"> <li>Support for Chinese language added. This is now an order option.</li> <li>Chinese HMI requires two language blocks so only 2 other languages are supported, by default these are English and French.</li> <li>IEC 60870-5-103 generic services added. This enables all measurements to be available with this protocol.</li> </ul>	V3.0 (Studio) or Later	P34x/EN M/I96
36	C	J/K	March 2011	<ul style="list-style-type: none"> <li>Rebranding software to ALSTOM.</li> <li>Correction to Px4x which stops receiving (processing) GOOSE messages when managed Ethernet switch parameterized for VLAN.</li> </ul>	V3.0 (Studio) or Later	P34x/EN M/I96

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
36	D	J/K	September 2011	<ul style="list-style-type: none"> <li>Correction P34x SW36 relay with DNP3 protocol and second rear communication card fitted causing the relay to continually reboot with error an code. This software correction was made before any relays of this specific build was released to customers.</li> </ul>	v3.0 (Studio) or Later	P34x/EN M/I96
36	E	J/K	May 2012	<ul style="list-style-type: none"> <li>Support for Parallel Redundancy Protocol (PRP) included. Order book for PRP opened in July 2012. The following 2 codes are used for digit 7 "Hardware Options" of the Px4x number/correct, for PRP Ethernet redundancy:           <ul style="list-style-type: none"> <li>N - Redundant Ethernet PRP, 2 multi-mode fibre ports + Modulated IIRG-B [ZN0071 Part 009].</li> <li>P - Redundant Ethernet PRP, 2 multi-mode fibre ports + Un-modulated IIRG-B [ZN0071 Part 010].</li> </ul> </li> <li>Generator Differential (87G) protection uses Phase CT ratio for both CT1 and CT2 phase current inputs in previous software versions. SW36E uses Phase CT1 and Phase CT2 ratio for CT1 and CT2 phase current inputs respectively for the generator differential protection (87G) which is now consistent with how the transformer differential protection (87T) operates.</li> <li>Correction to Px4x relay which uses the wrong Disturbance Record analogue signals magnitudes if the CT and VT ratios (primary/secondary) are not integers.</li> <li>Minor bug fixes</li> </ul>	v3.0 (Studio) or Later	P34x/EN M/I96
36	F	J/K	August 2013	<ul style="list-style-type: none"> <li>Correction to the Fault Time time stamp in fault records which does not take into account the local time offset setting.</li> <li>Correction to Thermal Overload <math>\Delta</math> setting which doesn't rescale when CT primary or secondary rating changed in MiCOM S1.</li> <li>Correction to P34x transformer hot spot thermal element which trips in extreme situations</li> <li>IEC 61850 corrections - DATA name for 3 Phase Power(s) and Power factor are wrongly named, Non-standard modelling of angle measurements in IEC 61850, The mappings of Measurement/SecDirMMXU1\$CF\$AMP\$SIUnit and Protection/SenSelPTOC4\$STS\$Health\$StVal are incorrect, There are some Data Attributes that are configured in the data model as Read Only, but are actually writeable; the Data Attributes in question are orCat and orIdent, Unit for Frequency (Hz) missing in Disturbance Record extracted over IEC 61850, Disconnection of one of IEC 61850 Client causes other IEC 61850 Connections being Lost.</li> <li>Minor bug fixes</li> </ul>	v3.0 (Studio) or Later	P34x/EN M/I96
37	A	M	March 2014	<ul style="list-style-type: none"> <li>New relay model, P348 for variable speed double fed induction machine protection. P348 includes IEC 61850-9-2 LE inputs to connect to non-conventional instrument transformers. V37 software applies to P348 model only.</li> <li>P348 includes RMS/Peak overcurrent, RMS/Peak overvoltage, RMS NPS overcurrent, RMS neutral voltage and overfrequency protection.</li> <li>Cybersecurity added.</li> <li>New front panel for P348 with xCPU3 with extended memory (M hardware - P34xxxxxxxxM).</li> </ul>	v3.0 (Studio) or Later	P34x/EN AD/J86

S/W Version Major	S/W Version Minor	H/W Version	Original Date of Issue	Description of Changes	S1 Compatibility	Technical Documentation
37	A	M	March 2014	<ul style="list-style-type: none"> <li>New power supply modules with field voltage removed. Order code - 7/8/9 for new power supply option (previously 1/2/3).</li> <li>New opto inputs to provide compliance with the latest IEC EMC surge standards and comply with UK ESI48-4EB2 capacitor discharge tests without using external resistors to sink the energy.</li> <li>Platform bug fixes added as 36 software.</li> <li>Minor bug fixes</li> </ul>	V1.0 (S1 Agile) or Later	P34x/EN M/la7
38	B	M/P	March 2014	<ul style="list-style-type: none"> <li>V38 software applies to P341-6 models only.</li> <li>New front panel for P341-6 with xCPU3 with extended memory (P hardware - P341-12xxxxxxxxP and M hardware -P343/4/5/6xxxxxxxxM).</li> <li>New power supply modules with field voltage removed. Order code - 7/8/9 for new power supply option (previously 1/2/3).</li> <li>New opto inputs to provide compliance with the latest IEC EMC surge standards and comply with UK ESI48-4EB2 capacitor discharge tests without using external resistors to sink the energy.</li> <li>Cybersecurity added.</li> <li>DNP 3.0 over Ethernet added.</li> <li>16 PSL counters added.</li> <li>PSL Timer time delay settable in PSL or Settings.</li> <li>Power protection enhancements.</li> <li>Number of stages of 3 phase Power protection has been increased from 2 to 4. Can select as Active Power and new Reactive Power mode. Operation in modes simplified - Forward/Reverse and Under/Over. Minimum setting reduced to approx 0.2%Sn. Single phase Sensitive Power has the same changes. Also includes new option to select the phase A or B or C. P345 Sensitive Power has 2 setting options 1 phase or new wattmetric power which uses 2 sensitive current inputs.</li> <li>Field failure protection has increased setting range for diameter and offset of the mho impedance characteristic. New directional line which can be used to block the mho characteristics in PSL.</li> <li>Independent voltage dependent overcurrent (51V) and underimpedance protection (21). Previously, only 51V or 21 could be enabled, now both can be enabled.</li> <li>3rd stage undervoltage protection (V&lt;3) added.</li> <li>Underimpedance setting range increased. 'Z&lt;1/2 Setting' maximum value increased to 500/lnQ (Vn=100/120V).</li> <li>Overset current definite time setting range increased. '1&gt;1/2/3/4 Time Delay' maximum value increased to 200s.</li> <li>Overset frequency definite time setting range increased. 'F&lt;1/2/3/4 Time Delay' maximum value is increased to 2000s.</li> </ul>	V1.0 (S1 Agile) or Later	P34x/EN M/la7

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
38	B	M/P	March 2014	<ul style="list-style-type: none"> <li>3rd harmonic 100% stator earth fault under/over voltage minimum setting (100% St EF VN3H&gt; and 100% St EF VN3H&lt;) reduced to 0.1 V (<math>V_n=100/120</math> V).</li> <li>Check synchronising phase angle setting range increased from 90 to 175 degree.</li> <li>and 'CS2 Phase Angle' maximum value increased from 90 to 175 degree.</li> <li>User programmable curves added for overcurrent, earth fault, sensitive earth fault, under/overvoltage, neutral overvoltage and V/Hz protection.</li> <li>Disturbance record analogue channels increased to a maximum of 20 channels.</li> <li>Bug fixes added as 36 software.</li> <li>Minor bug fixes</li> </ul>	V1.0 (S1 Agile) or Later	P34x/EN M/la7
38	C	M/P	May 2014	<ul style="list-style-type: none"> <li>Corrected issue where relay will generate a Maintenance Record from the PSL settable counter feature after downloading the firmware.</li> <li>Minor bug fixes</li> </ul>	V1.0 (S1 Agile) or Later	P34x/EN M/la7
38	D	M/P	February 2016	<ul style="list-style-type: none"> <li>Corrected issue where the Timer Block DDBs for each of the 4 stages of under frequency protection do not work.</li> <li>Minor bug fixes</li> </ul>	V1.0 (S1 Agile) or Later	P34x/EN M/la8
38	E	M/P	March 2022	<ul style="list-style-type: none"> <li>Fixed DNP communication issue where the DNP 3 communications stops after several hours. When the relay is configured for Failover and the RJ45 link is alive, the Standby Failover function won't switch over Ports. If the current active RJ45 port is disconnected, then the FO port becomes active and the communication resumes. The issue re-occurs after 10 to 12 hours. It can also occur with failover disabled.</li> <li>Fixed issue where CB Control Manual Close delay is not applied to one CB when "Opto" option is used to close the circuit breaker after a remote trip is issued.</li> <li>Fixed issue where after first start for V/F protection if there is a subsequent start the start signal will not re-operate but the relay protection will operate correctly in the correct operating time</li> </ul>	V1.0 (S1 Agile) or Later	P34x/EN M/la8
91	A	M	March 2022	<ul style="list-style-type: none"> <li>91A is for P345 only.</li> <li>Support for IEC61850 ED2. Firmware supports IEC61850 ED2 only - Not switching to ED1. This release does not include DNP3OE or Modbus protocols</li> <li>New Ethernet board support for CORTEC options R/S/T</li> <li>Duplicate GOOSE</li> <li>Migration of OS from VxWorks 5.4 to 6.9</li> <li>Device RBAC and redundant Server RBAC</li> <li>SYSLOG</li> <li>Multi-Client Reports</li> <li>Fixed Length GOOSE</li> <li>Default relay address changed from 255 to 1</li> <li>IEC 61850 LN numbering changed from 01, 02, 03 to 1, 2, 3 etc. Use of 01, 02...09 numbering for IEC61850 LNs can prevent some 61850 data attributes from updating correctly</li> <li>Unit (seconds) for the LockOut Period added</li> </ul>	V2.1.3 (S1 Agile) or Later	P345-AD-EN 1

SW Version Major	SW Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
91	A	M	March 2022	<ul style="list-style-type: none"> <li>Fixed issue where IEC 61850 Server has no respond for SetDataValues request on setSrcRef DA</li> <li>Fixed issue where System Frequency was locked at 50Hz. This can now be set to 50 or 60Hz</li> <li>Fixed issue where file size is incorrectly calculated when extracting a disturbance record over IEC61850 if number of channels selected is over 16</li> <li>Fixed issue to correct Active and Reactive Energy in three measurement modes (0, 1, 2, 3)</li> <li>Fixed issue where CB Control Manual Close delay is not applied to one CB when "Opto" option is used to close the circuit breaker after a remote trip is issued.</li> <li>Fixed PmFIMLFR mapping issue</li> </ul>	V2.1.3 (S1 Agile) or Later	P345-AD-EN-1
91	B	M	May 2025	<ul style="list-style-type: none"> <li>F&gt; setting range changed to 70Hz and frequency tracking range changed to 75Hz</li> <li>Fixed IEC 61850 Interoperability issue with Siemens clients</li> <li>Fixed issue where Frequency setting - (courier cell [0009] ) cannot be set to 60Hz from the default 50Hz value.</li> <li>IEC 61850 LN numbering changed from 01, 02, 03 to 1, 2, 3 etc. Use of 01, 02...09 numbering for IEC61850 LNs can prevent some 61850 data attributes from updating correctly</li> <li>Fixed issue where cancelling an SBO command will incorrectly wait for select time out to expire</li> <li>Fixed issue where file size is incorrectly calculated when extracting DR over IEC61850 if number of channels selected is over 16</li> <li>Fixed issue where the IED stops IEC 61850 MMS reporting after sequences of IEC 61850 MMS controls to PIoGGIO/SPCSO Controls Inputs, if these are configured with either: (1) SBO with enhanced security or (2) Direct Control with enhanced security.</li> <li>IEC 61850 Association ServiceSupportedCalled includes support for obtainFile</li> <li>Fixed issue where relay should not send out CommandTermination - when the operation is positive and the value is changed in IEC 61850 DOes and SBOes</li> <li>Fixed issue where the control will now correctly fail when the device is in On Mode and the Control comes with the Test flag set</li> <li>Fixed IEC 61850 Ed2 issue where for a free BRCB, ResvTms must be &gt;0 value if client does not write it</li> <li>Fixed issue where IEC 61850 Server has no respond for SetDataValues request on setSrcRef DA</li> <li>Fixed issue where the IIG-B Status changes to 'Card Failed' from 'Signal Healthy' over a long connection</li> <li>Fixed issue related to NIC No Response and NIC MemAlloc Fail Alarms if dataset contains CF elements</li> <li>Fixed issue with malformed packet from P40 IEDs One of the IEC 61850 Clients can occasionally give up the association with a P40 relay - In most cases this is observed after a control action from the client</li> </ul>	V2.1.3 (S1 Agile) or Later	P345-AD-EN-1.1

S/W Version Major	S/W Version Minor	H/W Version	Original Date of issue	Description of Changes	S1 Compatibility	Technical Documentation
91	B	M	May 2025	<ul style="list-style-type: none"> <li>Fixed issue where if a user creates a dataset and adds SI units' data attributes under the CF functional constraint and configures the RBCB with that dataset and Enables RBCB with IEDs, the connection to the relay is lost</li> <li>The CFG file has been updated to use the correct data scaling identifier, P. The data scaling identifier P (Primary) or S (Secondary) was previously S in the disturbance records. The analogue values stored in the DAT file are always in Primary.</li> <li>Fixed cyber security vulnerability in TMW Library for DNP3.0</li> <li>Fixed issue where the trip time is less than 2.5 ms, the DifLzdPDIIF1 element does not operate in IEC 61850</li> <li>Fixed incorrect Courier cell mapping for EC 61850 PPV / PNsAB</li> <li>Fixed issue with Virtual Outputs 8 and 9 not changing status when the input is high</li> </ul>	V2.1.3 (S1 Agile) or Later	P345-AD-EN-1.1

## 2 SOFTWARE VERSION COMPATIBILITY

IED S/W Version	Setting File Version	Menu Text File Version* <sup>8</sup>	PSL File Version
01	01	01	01
02	01, 02	02	01, 02
03	01, 02, 03	03	01, 02, 03
04	01, 02, 03, 04	04	01, 02, 03, 04
05	05	05	05, 06
06	06	06	05, 06
07	06, 07	07	05, 06, 07
30	30	30	30
31	30, 31	31	30, 31
32A-B	32	32	32
32C-D	32	32	32
32E-L	32	32	32
33	32, 33	33	33
35	33, 35	35	33, 35
36	33, 35, 36	36	36
38	38	38	36, 38
91	91	91	91

### Notes:

- \*1: Compatible except for Disturbance recorder digital channel selection.
- \*2: Additional functionality added such that setting files from earlier software versions will need additional settings to be made.
- \*3: Compatible except for Disturbance recorder digital channel selection & settings for additional functionality will be missing.
- \*4: Compatible except for the Disturbance recorder digital channel selection and the distance settings.
- \*5: Compatible except for Disturbance recorder digital channel selection & the setting file contains a large number of Distance setting which will each produce an error on download.
- \*6: Additional DBs were added such that PSL files from earlier software versions will not be able to access them.
- \*7: Additional DB for the Distance protection will not be included.
- \*8: Menu text remains compatible within each software version but is NOT compatible across different versions.



GE VERNONA

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