

EasyWarePro Message Numbers

Important note:

- Several clarifications have been made in this version of the AppNote, and the exact wording for the descriptions of the message numbers is only valid beginning from EasyWare Pro (or EasyOne Connect) V03.07.00.02.
- This revision of the application note contains new warning messages, that are related to the quality grading of the ATS/ERS DLCO 2017 standard.
- This revision of the application note includes message numbers that have been introduced with V3.5.1.7. Additionally, the applicable test types for message number 1 have been corrected. Message number 1 was not applied for FVL tests in versions lower than V3.5.1.7 and has been replaced by message number 38 in version V3.5.1.7.
- The maximum number of error codes stored per trial has been increased from 3 to 7 in software version V3.5.1.7

For all types of tests, EasyWarePro (or EasyOne Connect) contains a parameter called “Message No”. This parameter contains information about errors and warnings associated with a trial. This parameter is also available in the XML export file.

The parameter Message No. contains a maximum of 7 error or warning codes using the following format: “aabbccddeeffgg.00”. Each number consists of 2 digits, except the first number, which might only consist of 1 digit.

- Example: 2.00 → Warning 2
- Example: 21415.00 → Warning 2, 14 and 15
- Example: 220211.00 → Warning 22, 2 and 11
- Example: 111234.00 → Warning 11, 12 and 34

Remark: From V3.5.1.7 onward, 7 error numbers are supported. Previous versions allowed a maximum of 3 error or warning codes.

The following table contains a list of all error and warning codes, with short descriptions of the causes for these particular warnings or errors, and possible resolutions.

Some error or warning messages do not appear if another message is shown.

The column ‘Action’ contains the following symbols:




Everything is OK, no action required











The problem can be resolved by patient



The problem can be resolved by checking the EasyOne Pro device.






No.	Action	Test Type	Description
0		All	No error or warning, test is OK

No.	Action	Test Type	Description
1		FVC	<p>Abrupt end of test detected</p> <p>Problem: Patient may not have exhaled completely. Detailed criteria: Expiration time was less than 2 seconds; or volume during last 2 seconds >30 ml (expiration time between 2 and 7 sec) or >45 ml (expiration time >7 sec).</p> <p>Solution: The patient must exhale longer and force as much air as possible out of his or her lungs.</p> <p><i>Remark: this message is replaced by no. 39 in EasyOne Connect version 3.5.1.7.</i></p>
2		FVC, FVL	<p>Patient hesitation detected</p> <p>Problem: Patient hesitation detected. Detailed criteria: Back-extrapolated volume greater than 150 ml, or 5% of FVC whichever is greater (for age ≤6: 80 ml or 12.5% of FVC whichever is greater).</p> <p>Solution: The patient must blast out as quickly and as hard as possible.</p>
3		FVC, FVL	<p>Please, blow out faster</p> <p>Problem: Peak flow is delayed. Detailed criteria: Time until peak flow greater than 160 ms.</p> <p>Solution: The patient must blast out as quickly and as hard as possible.</p>
4		FVC, FVL	<p>Please, blow out longer</p> <p>Problem: Patient may not have exhaled completely. Detailed criteria: Expiration time less than 2 seconds. OR volume in the last 0.5 seconds of the expiration more than 100 ml.</p> <p>Solution: The patient must exhale longer and force as much air as possible out of his or her lungs.</p> <p><i>Remark: this message is replaced by no. 38 in EasyOne Connect version 3.5.1.7.</i></p>
5		FVC, FVL	<p>Unable to detect forced maneuver</p> <p>Problem: Software was unable to detect a forced maneuver.</p> <p>Solution: Please retry maneuver and follow the instructions that are shown during the maneuver.</p>
6		SVC	<p>Unable to detect steady tidal breathing</p> <p>Problem: The software was unable to detect steady tidal breathing. Detailed criteria: All end-inspiratory volumes of 3 breaths are not within 200 ml, and/or the difference in VT of 3 breaths is larger than 200 ml.</p> <p>Solution: Please instruct the patient to breathe steadily during tidal breathing phase.</p>
7		SVC	<p>Incomplete maneuver, unable to calculate IRV</p> <p>Problem: Unable to detect complete maneuver and to calculate IRV.</p> <p>Solution: Please retry maneuver and follow the instructions that are shown during the maneuver. Complete in- and expiration are required.</p>
8		SVC	<p>Incomplete maneuver, unable to calculate ERV</p> <p>Problem: Unable to detect complete maneuver and to calculate ERV.</p> <p>Solution: Please retry maneuver and follow the instructions that are shown during the maneuver. Complete in- and expiration are required.</p>












No.	Action	Test Type	Description
9		FVC, FVL	<p>Test started too early</p> <p>Problem: Early test start detected. Detailed criteria: The time to peak flow (PEFT) is less than 30 ms, or flow detected before test was started.</p> <p>Solution: Please instruct the patient to wait until the baseline setting is finished and until the software signals to start the test.</p>
10		FVC, FVL	<p>Cough detected</p> <p>Problem: A cough has been detected.</p> <p>Solution: Please instruct the patient to avoid coughing during the measurement.</p>
11		DLCO	<p>Gas inspiration time too long</p> <p>Problem: Long inspiration time detected. Detailed criteria: Inspiration time > 4.0 seconds.</p> <p>Solution: Please instruct the patient to inhale test gas faster.</p>
12		DLCO	<p>Breath hold time out of range</p> <p>Problem: Breath hold time is out of range. Detailed criteria: Breath-hold time is out of range (8-12 seconds).</p> <p>Solution: Please instruct the patient to exhale immediately when the corresponding message shows and when the valve opens.</p>
14		Cal-Check	<p>Calibration result out of range – Check setup</p> <p>Problem: Calibration result is out of range. Detailed criteria: The measured volume is out of $\pm 3.5\%$ of the target value.</p> <p>Solution: Please check the test setup and repeat the test. If error reappears please contact service.</p>
15		Cal-Check	<p>Try again - Flow criteria not met!</p> <p>Problem: Cal-syringe flow rate too fast or too slow</p> <p>Solution: Please perform the calibration check with the appropriate flow speed.</p>
16		Cal-Check	<p>Inspiratory or expiratory maneuver not detected</p> <p>Problem: Only an inspiratory or expiratory maneuver detected (and not both).</p> <p>Solution: Please perform complete inspiratory and expiratory maneuvers and follow the given instructions.</p>
17		DLCO	<p>Check complete gas connection and valve assembly</p> <p>Problem: Significant difference between calibration and inspiratory CO concentration detected.</p> <p>Solution: Please check complete gas connection and valve assembly and that test is performed correctly.</p>
18		DLCO	<p>Low inspiratory volume detected</p> <p>Problem: The Inspiratory volume of the DLCO test is <85% of the target value.</p> <p>Solution: Please encourage the patient to inhale at least up to the dotted volume line, which indicates 90% (for DLCO 2017) or 85% (for DLCO 2005) of the expected VC.</p>

No.	Action	Test Type	Description
19		DLCO	<p>Check complete gas connection and valve assembly</p> <p>Problem: Significant difference between calibration and inspiratory CO concentration detected.</p> <p>Solution: Please check complete gas connection and valve assembly, and that test is performed correctly.</p>
20		DLCO	<p>Check patient technique, gas supply and valve assembly</p> <p>Problem: The alveolar helium concentration measured is out of range.</p> <p>Solution: Please check complete gas connection and valve assembly, and that test is performed correctly.</p>
21		DLCO	<p>Check patient technique, gas supply and valve assembly</p> <p>Problem: The expiratory CO concentration measured is out of range.</p> <p>Solution: Please check complete gas connection and valve assembly, and that test is performed correctly.</p>
22		DLCO	<p>Check patient technique, gas supply and valve assembly</p> <p>Problem: The alveolar CO concentration measured is out of range.</p> <p>Solution: Please check complete gas connection and valve assembly, and that test is performed correctly.</p>
23		DLCO	<p>Check patient technique, gas supply and valve assembly</p> <p>Problem: The alveolar volume (VA) is out of range.</p> <p>Solution: Please check complete gas connection and valve assembly, and that test is performed correctly.</p>
24		DLCO	<p>Check patient technique, gas supply and valve assembly</p> <p>Problem: The measured DLCO value is out of range.</p> <p>Solution: Please check complete gas connection and valve assembly, and that test is performed correctly.</p>
25		MBW	<p>Unable to calculate FRC extrapol – Please check for leaks</p> <p>Problem: The extrapolated MBW volume (i.e., the volume that would be washed out after the washout has been stopped) cannot be determined.</p> <p>Solution: Do not stop the washout too early and/or check for leaks.</p>
26		MBW	<p>FRC extrapol too high - Do not stop the washout too early</p> <p>Problem: The extrapolated MBW volume (i.e., the volume that would be washed out after the washout has been stopped) is greater than 1 liter.</p> <p>Solution: Do not stop the washout too early and/or check for leaks</p>
27		MBW	<p>Inspiratory gas leak detected</p> <p>Problem: Inspiratory gas leak detected. Detailed criteria: The end-inspiratory molar mass deviates from the tracer gas molar mass. This indicates that ambient air is inspired during the maneuver.</p> <p>Solution: Please check valves and that FRC barriette and spirette are properly inserted. Check that nose clip is properly positioned and that patient is breathing normally.</p> <p>Remark: this message only appears in EasyOne Connect versions before 2.1.0.9.</p>

No.	Action	Test Type	Description
28	 	MBW	High inspiratory or expiratory pressure detected Problem: High inspiratory or expiratory pressure detected. Detailed criteria: Peak pressure at the flow sensor exceeds +/-5 mb. Solution: Please check that O2 inlet pressure is set to 3-4 bar or 44-58 psi. Only minimal pressure variations are allowed during the test. Ensure that patient's breathing is not too deep or too fast, and is within the limits of ± 1.5 l/s.
29		MBW	Check complete gas connection and valve assembly Problem: Side-stream flow is out of range (<6 ml/s or > 12 ml/s). Solution: Please check complete gas connection and if patient tube (Maintenance kit) needs to be replaced. Contact support if error persists. <i>Remark: this message only appears in EasyOne Connect versions before 1.9.0.19.</i>
30		DLCO	Allow device to warm up. Problem: CO sensor drift detected. Solution: Please let the instrument warm up and repeat the test. If the error reappears, please contact service.
31		MBW	N2 concentration at end of test too high – Longer washout required Problem: Tracer concentration at end of test too high. Detailed criteria: tracer concentration at end of test is >2% N2. Solution: Repeat the test, encouraging the patient to continue breathing until at least 3 breaths with concentrations below 2% N2 are achieved.
32		MBW	The automatic calibration of the CO2 sensor failed Problem: The automatic calibration of the CO2 sensor failed. Solution: Repeat the test. If the error reappears, contact service. <i>Remark: this message only appears in EasyOne Connect versions before 2.1.0.9.</i>
33	 	DLCO	CO level too high – Please respect waiting time between trials Problem: CO level during tidal breathing too high. Solution: Wait at least four minutes between DLCO tests. Please also check the DLCO valve unit. If the error occurs repeatedly, contact service.
34		MBW	Tidal breathing volume too low Problem: Tidal breathing volume too low. Detailed criteria: Tidal volume outside 4 to 30 mL/kg bodyweight. OR outside 0.25 to 0.3 L if the body weight is not stated. Solution: Ask patient to breathe regularly, calmly and within the suggested range.
35	 	MBW	Check patient technique, gas supply and check for leaks Problem: Volume drift during washout test detected. The volume drift correction could not be performed and/or the parameters IRV and/or ERV are smaller than zero. Solution: Check for correct test performance and/or for leaks. If the error occurs repeatedly, contact service.

No.	Action	Test Type	Description
37		FVC, FVL	<p>End of test criteria not met (short exhalation time)</p> <p>Problem: Patient has not exhaled long enough, in accordance with ATS/ERS exhalation time criteria. Detailed criteria: expiration time was less than 6 seconds, for patients with age \geq 10 years; or less than 3 seconds for patients that are between 7 and 10 years old. No criteria is applied for patients \leq 6 years (preschool age).</p> <p>Solution: Please motivate the patient to exhale longer and force as much air as possible out of his or her lungs.</p> <p><i>Remark: this message was introduced with EasyOne Connect version 3.5.1.7.</i></p> <p><i>Note: this warning can be enabled or disabled in the configuration (setting "Enforce minimum 6-second expiration")</i></p>
38		FVC, FVL	<p>Abrupt end of test detected</p> <p>Problem: Short expiration time or high flow at end of test detected. Patient may not have exhaled completely. Detailed criteria: For patients with age \geq 7 years, volume during the last 0.5 seconds $>$ 100ml, or exhalation time less than 2 seconds. No criteria applied for age \leq 6 years (preschool age).</p> <p>Solution: The patient must exhale longer and force as much air as possible out of his or her lungs.</p> <p><i>Remark: this message was introduced with EasyOne Connect version 3.5.1.7.</i></p>
39		FVC, FVL	<p>End of test criteria not met (Plateau criteria)</p> <p>Problem: Patient may not have exhaled completely, in accordance with ATS/ERS plateau criteria. Detailed criteria: For patients with age \geq 7 years, volume during the last second $>$ 25ml. No criteria applied for age \leq 6 years (preschool age).</p> <p>Solution: Please motivate the patient to exhale longer and force as much air as possible out of his or her lungs.</p> <p><i>Remark: this message was introduced with EasyOne Connect version 3.5.1.7.</i></p>
40		DLCO	<p>$VI < 90\%$ of largest VC</p> <p>Problem: Patient may not have inhaled completely. Additional note: ATS/ERS criteria are still fulfilled if VI is between 85% and 90% of the largest VC in the same test session and VA is $\geq 0.95 * V_{Amax}$ OR VA is $\geq V_{Amax} - 200\text{mL}$; where V_{Amax} is the largest VA from other maneuvers graded as A.</p> <p>Solution: Please encourage the patient to inhale at least up to the dotted volume line, which indicates 90% of the expected VC.</p>
41		DLCO	<p>$VI < 80\%$ of largest VC</p> <p>Problem: Patient may not have inhaled completely.</p> <p>Solution: Please encourage the patient to inhale at least up to the dotted volume line, which indicates 90% of the expected VC.</p>

No.	Action	Test Type	Description
46		All	Timeout identified Problem: A timeout has occurred during the maneuver. Solution: Please follow all test instructions.
47		All	Device error Problem: An unexpected device error occurred. Solution: Please check if sensor is connected correctly and repeat trial.
48		All	Invalid trial, please repeat trial Problem: Trial did not meet acceptability criteria Solution: Please repeat trial.

Nr.	Action	Test Type	Description
50		All	No error or warning, test is OK
51		All	Error (51): Test started too early Problem: Early-Start detected. Solution: Wait until the instrument signals to start the test.
52		FVC, FVL, MVV, SVC	Error (52): Unable to detect maneuver Problem: Unable to detect maneuver. Solution: Please retry maneuver and follow the instructions that are shown during the maneuver.
54		DLCO	Error (54): Unable to get sampling volume – Please blow out longer Problem: Unable to get sampling volume. Solution: Ask patient to exhale enough volume after the breath hold.
55		DLCO	Error (55): Incorrect test procedure Problem: Incorrect test procedure. Solution: Please retry maneuver and follow the instructions that are shown during the maneuver.
56		DLCO	Error (56): Incorrect test procedure Problem: Incorrect test procedure. Solution: Please retry maneuver and follow the instructions that are shown during the maneuver.
57		DLCO	Error (57): Unable to detect DLCO inspiration – Please follow test instructions Problem: Unable to detect DLCO inspiration and to determine starting point of breath-hold time (Jones & Mead). Solution: Please retry maneuver and follow the instructions that are shown during the maneuver.
59		DLCO	Error (59): Check valve assembly and check for leaks Problem: Unstable CO concentration during breath hold. Detailed criteria: CO not within +50..-800 ppm. Solution: Please check for leaks (valves, patient mouth) and follow the instructions that are shown during the maneuver.
60		DLCO	Error (60): Check gas supply and check for leaks Problem: Side-stream time-delay incorrectly determined. Solution: Please check complete gas connection and valve assembly, and that test is performed correctly.
61		DLCO	Error (61): Check gas supply and check for leaks Problem: CO sensor calibration failed. Solution: Please check complete gas connection and valve assembly, and check for leaks.
62		DLCO	Error (62): Check gas supply and check for leaks Problem: CO sensor is out of range (clipping). Solution: Please check complete gas connection and valve assembly, and check for leaks.

Nr.	Action	Test Type	Description
63		DLCO	Error (63): Check gas supply and check for leaks Problem: CO sensor 3-point calibration error (S-Factor range). Solution: Please check complete gas connection and valve assembly, and check for leaks.
64		DLCO	Error (64): Check gas supply and check for leaks Problem: CO sensor 3-point calibration error (3-point level out of range). Solution: Please check complete gas connection and valve assembly, and check for leaks.
65		DLCO	Error (65): Check gas supply and check for leaks Problem: CO sensor 3-point cal error (sd of 3-point level out of range). Solution: Please check complete gas connection and valve assembly, and check for leaks.
66		MBW	Error (66): No start of washout detected Problem: No start of washout detected. Solution: Please follow the instructions that are shown during the maneuver. <i>Remark: this message only appears in EasyOne Connect versions before 2.1.0.9.</i>
67		MBW	Error (67): Check gas supply and breathe regularly Problem: Side-stream time-delay incorrectly determined. Solution: Please check complete gas connection and valve assembly, and that test is performed correctly (breathe regularly).
68		MBW	Error (68): Not enough breaths for washout analysis Problem: Not enough breaths for washout analysis detected. Solution: Repeat the test without stopping it early.
69		MBW	Error (69): Check gas supply and check for leaks Problem: Leak or wrong test gas detected. Solution: Check test gas, gas supply and check for leaks. <i>Remark: this message only appears in EasyOne Connect versions before 2.1.0.9.</i>
70		MBW	Error (70): Check gas supply, check for leaks and breathe regularly Problem: Unable to evaluate Multi-Breath-Washout. Solution: Please breathe regularly. Check complete gas supply and check for leaks. <i>Remark: this message only appears in EasyOne Connect versions before 2.1.0.9.</i>
71		DLCO	Error (71): Allow device to warm up Problem: CO sensor drift detected. Solution: Allow the CO sensor to warm up. If error reappears, contact service.