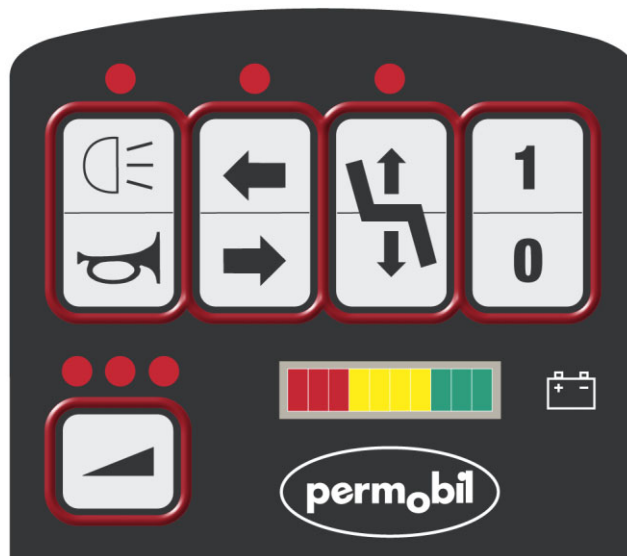


Instructions for Use

Mini-Config

*Error Codes for
Safe Gate Panel*



US

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Mini-Config

Mini-Config is the name of the function in which the buttons on the driving panel are used to activate, change and terminate settings for driving properties and other functions.

No extra accessories are required to set these properties and they are designed so that they can be set away from home. While these settings are being made, the chair is “locked”, i.e. no other functions can be activated and the chair cannot be driven. If there should be any doubt about the settings, the factory settings can always be restored.

Three different parameter sets can be stored in Mini-Config.

The parameter set is chosen by holding down one of the “LIGHTS”, “L. INDICATORS” and “SEAT UP” buttons when the chair is switched on. The parameters which are stored under the button concerned are then used by the chair. The same parameters are also used when the chair is subsequently switched on using just the ON button (does not apply to chairs with Tracker VS1 Track-follower, on which each parameter set is linked to a certain function).

NOTE

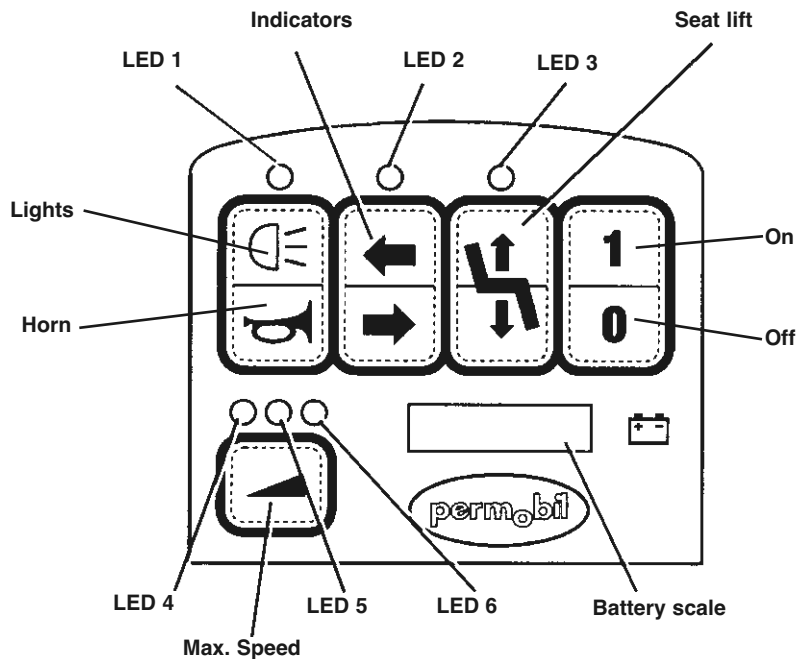
If you want to prevent others from using Mini-Config, the ability to access Mini-Config can be switched on/off by holding down the SEAT DOWN button for 1 second when the chair is switched on. Two beeps means ‘Mini-Config locked’ and three beeps means ‘Mini-Config unlocked’. Please note that the settings still apply and that different parameter sets cannot be selected.



WARNING !

All changes should be carried out by personnel with good knowledge of Mini-Config, as the chair may otherwise be incorrectly set and, in the worst case scenario, cause personal injury.

Buttons and LEDs on the Driving Panel



Starting Mini-Config

Hold down the LIGHTS and MAX. SPEED buttons and start the chair with the ON button.

LED 4 (for page 1) and LED 1 (for parameter 1) light up.

NB! Mini-Config must be unlocked. Read under the heading **NOTE** on page 6.

The parameter set which is changed is the set chosen last, i.e. the set used when the chair was last switched on.

Closing Mini-Config

Press the ON button.

LED 1, LED 2 and LED 3 flash. Press the button under which the parameters are to be saved (LIGHTS, L. INDICATORS or SEAT UP). The LED above the button selected flashes. Press the ON button again to confirm the button selected or press another button if you want to change your mind.

If no button is selected (three LEDs flashing) and the ON button is pressed, the parameters will be saved in the "active area" and will apply until the parameter set is changed (by holding down LIGHTS, L. INDICATORS or SEAT UP when the chair is switched on), when the active area is overwritten.

The settings will be saved and the chair starts up as usual with the parameters just set.

Aborting Mini-Config

Press the OFF button (0). The changes are ignored and the chair is switched off.

Copying Mini-Config

It is possible to copy a parameter set from one panel to another by holding down the button under which the parameters are to be saved (LIGHTS, L. INDICATORS, SEAT UP) on the panel to which the set is to be copied while starting the chair from the panel from which the set is to be copied.

Destination: Hold down the button under which the parameters are to be saved.

Source: Start the chair.

KOALA, ENTRA

Settings

Parameters are chosen by pressing the LIGHTS, HORN, INDICATORS, SEAT LIFT buttons in 3 different pages.

The page is chosen by pressing the MAX. SPEED button.

The page (1-3) chosen is indicated by LED 4-6 (see table).

A total of 18 different settings can be made.

The function which is active is shown by LED 1-3 being permanently lit or flashing. Permanently lit indicates the upper button (for example, LIGHTS) and flashing indicates the lower button (for example, HORN).

The value of a parameter is changed using the joystick. Moving the joystick to the right or upwards increases the parameter value. Moving the joystick to the left or downwards decreases the parameter value.

The value of the parameter in question can be seen on the BATTERY scale. The number of LEDs lit depends on the maximum value of the parameter. For all parameters, the entire battery scale lights up when the parameter has reached its maximum value.

A function is closed by pressing a different function button or by closing/aborting the Mini-Config program.

Program version 2.x

Page	Parameter	Designation	Parameter range	Std.	Setting
		Set STEERING CORRECTION WHEN DRIVING	0 - 20	10	
		Set STEERING CORRECTION WHEN BRAKING	0 - 20	10	
		Set MAX. SPEED.	0 - 10	10	
		Set MAX. FORCE.	0 - 10	10	
		Set ACCELERATION.	0 - 10	6	
		Set TURN ACCELERATION	0 - 10	6	
		Set HEX STEERING.	0 - 1	1	
		Set BRAKING DISTANCE.	0 - 5	2	
		Set IMPACT PROTECTION.	0 - 1	1	
		Set AUTO-KILL time.	0 - 10	3	
		Set LOG RESPONSE ¹⁾ .	1 - 3	1	
		Set SPASTIC.	0 - 3	0	
		Set DEADBAND.	0 - 5	0	
		Set SHORT JOYSTICK , X DIRECTION.	1 - 5	5	
		Set SHORT JOYSTICK , Y DIRECTION.	1 - 5	5	
		Set REVERSE JOYSTICK, X DIRECTION.	0 - 1	0	
		Set REVERSE JOYSTICK, Y DIRECTION.	0 - 1	0	
		Restore factory settings.	0	-	

- Max. value:**
- 20 = Lit in "half steps" with flashing LEDs.
 - 10 = 1 LED per increase of parameter value.
 - 5 = 2 LEDs per increase of parameter value.
 - 3 = A new color per increase of parameter value.
 - 1 = Full battery scale lit up.

- Permanently lit
- Flashing

¹⁾ Not available at present!

Koala, Entra

Program version 1.x

Page	Parameter	Designation	Parameter range	Std.	Setting
		Set STEER CORRECTION WHEN DRIVING.	0 - 20	10	
		Set STEER CORRECTION WHEN BRAKING.	0 - 20	10	
		Set MAX. SPEED.	0 - 10	10	
		Set MAX. FORCE.	0 - 10	10	
		Set ACCELERATION.	0 - 10	7	
		Set TURN ACCEL'N.	0 - 10	7	
		Set HEX STEERING.	0 - 1	1	
		Set BRAKING DISTANCE.	0 - 5	2	
		Set IMPACT PROTECTION.	0 - 1	1	
		Set AUTO-KILL time.	0 - 10	3	
		N/A	1 - 3	1	
		Set SPASTIC.	0 - 3	0	
		Set DEADBAND.	0 - 5	0	
		Set SHORT JOYSTICK , X DIRECTION.	1 - 5	5	
		Set SHORT JOYSTICK , Y DIRECTION.	1 - 5	5	
		Set REVERSE JOYSTICK, X DIRECTION.	0 - 1	0	
		Set REVERSE JOYSTICK, Y DIRECTION.	0 - 1	0	
		Set LOG RESPONSE, Y DIRECTION.	1 - 3	3	
		N/A	0 - 10	5	
		N/A	1 - 10	7	
		Set LEVERMANSPEED.	1 - 10	5	
		N/A	0 - 20	10	
		Set LEVERMANMOD.	0 - 2	1	
		Restore factory settings.	0	-	

● Permanently lit ● Flashing

Max. value: 20 = Lit in "half steps" with flashing LEDs.
 10 = 1 LED per increase of parameter value.
 5 = 2 LEDs per increase of parameter value.
 3 = A new colour per increase of parameter value.
 1 = Full battery scale lit up.

KOALA, ENTRA

Parameters

Steer correction when driving

Trim parameter for the motors. Used if the chair is turning although the joystick is straight ahead. Can be set 0-20, where everything less than 10 means that the chair steers more to the left and everything over 10 means that the chair steers to the right.

In order to be able to represent 20 values on a display with only 10 LEDs, the following half steps are used: the LEDs either flash or light up permanently, where flashing means 1 and permanently lit means 2.

Example 1: Four LEDs permanently lit means the parameter value 8 (4x2).

Example 2: Four LEDs permanently lit and one flashing means the parameter value 9 (4x2+1).

Joystick right/upwards = Increase parameter value, turn right.

Joystick left/downwards = Decrease parameter value, turn left.

The untrimmed parameter is 10.

Steer correction when braking

Trim parameter for the motors. Used if the chair is turning when braking hard. It is set in the same way as Steer correct driving.

The untrimmed parameter is 10.

Max. speed

Can be set from 10% to 100% of the highest max. speed (speed potentiometer value). 10 is max. speed (100%).

Use the joystick to select.

Joystick right/upwards = Increase speed.

Joystick left/downwards = Decrease speed.

The standard value is 10 (100%).

Max. force

Sets the maximum torque on the wheels. Use the joystick to select.

Sets the maximum torque on the wheels.

Use the joystick to select.

Joystick right/upwards = Increase force.

Joystick left/downwards = Decrease force.

The standard value is 10.

Acceleration

Sets how fast the chair is to accelerate.

Joystick right/upwards = Increase acceleration.

Joystick left/downwards = Decrease acceleration.

The standard value is 6.

Turn acceleration

Sets the permitted acceleration in a turn.

Set in the same way as ACCELERATION.

The standard value is 6.

HEX steering

NB! This parameter setting is not implemented in all program versions.

Switches on/off inverted reverse steering.

Joystick right/upwards = switch on Hex control, battery scale lights up.

Joystick left/downwards = switch off Hex control, battery scale goes out.

Hex control is on as standard.

Braking distance

Sets the braking distance. The standard setting is 2.

NB! The braking distance values are approximate.

Parameter value	Braking distance
0	0.90 m
1	0.95 m
2	1.00 m
3	1.10 m
4	1.15 m
5	1.20 m

Collision protection

Sets whether the chair is to stop or reduce force and speed when an obstacle is detected (applies only to chairs which can be fitted with collision protection).

Joystick right/upwards = reduction of speed and force

Joystick left/downwards = stop

The standard setting is reduced speed and force.

Sleep

Sets the delay before the chair switches off if the joystick is not activated.

Parameter value	Delay
0	10 seconds
1-9	10-90 minutes
10	Infinite

The standard value is 30 minutes.

Log Response

NB! *This parameter setting is not implemented in Ver. 2.x*

Produces different logarithmic values for the joystick.

Must be set to 1 when using Co-pilot.

Spastic

Four settings for how much play there is to be for the steering. (Play= deadband of joystick detection in left/right direction).

Joystick right/upwards = Increase play.

Joystick left/downwards = Decrease play.

0% play= Battery scale off (standard), i.e. switched off.

15% play= Red part of battery scale lit up.

25% play= Red + yellow parts of battery scale lit up.

40% play= Entire battery scale lit up.

0% play is standard.

Deadband

Sets the size of the deadband forwards/backwards; 0-20% of max. joystick deflection in steps of 4% units.

Joystick right/upwards = Increase deadband by 4% units.

Joystick left/downwards = Decrease deadband by 4% units.

0% deadband is standard.

Short joystick, X direction

Shorter joystick limits in the X direction for steering, leverman entry and stepping through menus, etc.
 20 -100% of mechanical joystick movement required to achieve full joystick deflection.
 Joystick right/upwards = Increase parameter.
 Joystick left/downwards = Decrease parameter.
 100% is the standard value.

Short joystick, Y direction

As for SHORT JOYSTICK, X DIRECTION, but for shorter joystick limits in the Y direction for speed.
 100% is the standard value.

Reverse joystick, X direction

Reverses the direction of the joystick's X axis, i.e. the chair turns to the left when the joystick is moved to the right.
 Joystick right/upwards = Reverse joystick on (inverted joystick deflection). Battery scale lit up.
 Joystick left/downwards = Reverse joystick off (normal driving). Battery scale off.
 Normal driving (NOT reverse joystick) is standard.

Reverse joystick, Y direction

Reverses the direction of the joystick's Y axis, i.e. the chair reverses when the joystick is moved forwards.
 Joystick right/upwards = Reverse joystick on (inverted joystick deflection). Battery scale lit up.
 Joystick left/downwards = Reverse joystick off (normal driving). Battery scale off.
 Normal driving (NOT reverse joystick) is standard.

Leverman speed

NB! This parameter setting is not implemented in Ver. 2.x

Sets how fast you can step between settings in leverman
 Use the joystick to choose.
 Joystick right = Increase parameter.
 Joystick left = Decrease parameter.
 The standard value is 5.

Leverman mode

NB! This parameter setting is not implemented in Ver. 2.x

Can be set 0-2.
 Use the joystick to choose parameter setting.
 Joystick right = Increase parameter.
 Joystick left = Decrease parameter.

Parameter value	Leverman mode
0	No leverman
1	Leverman through the light button or Joystick left.
2	Leverman through the light button, Joystick left, or two fast joystick movements backwards.

The standard value is 1.

Restore factory settings

Joystick right/upwards OR left/downwards = The battery scale begins to go out. This means that the factory settings are being restored. These are saved if the ON button is pressed (the chair starts immediately) or ignored if the OFF button is pressed (the chair is switched off).

KOALA, ENTRA

Alarms and Error Codes

Alarm categorization:

Alarms can belong either to the “user-remedied error” category or the “engineer-remedied error” category.

Check first whether an alarm belongs to the “user-remedied error” category. These alarms/warnings are indicated without unit affiliation. These “user-remedied errors” are indicated by the battery scale flashing/“flowing” or in some cases by one/some of the LEDs flashing. If both the battery scale and some of the LEDs flash, the alarm belongs to the “engineer-remedied error” category.

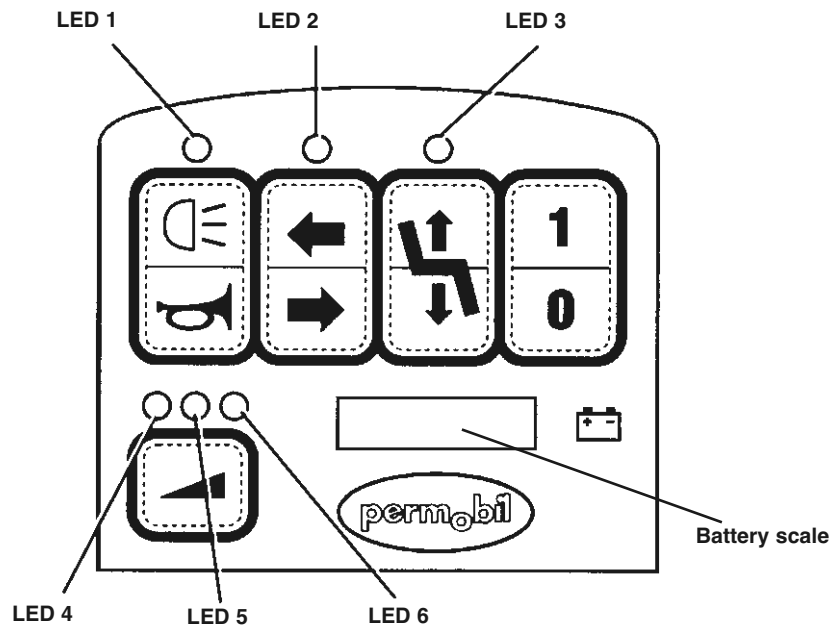
In those cases in which an alarm belongs to the “engineer-remedied error” category, i.e. a combination of flashing LEDs and battery scale, the combination of the LEDs indicates the unit producing the alarm, while the battery scale indicates which alarm the unit is producing (1 -10). These indications are called error codes.

Error codes

Each part of the electronics on the chair (for example, panel, motor controller, etc.) can, in the event of an alarm, transmit error codes which are displayed on the panel’s LEDs (LED 1 - LED 6) and battery scale.

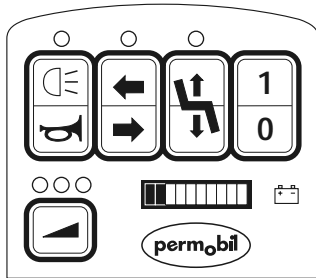
LED 1 to LED 6 show which part of the chair’s electronics has a problem. The battery scale LEDs 1-10 show which error has occurred. 10 dashes on the battery scale can represent 10 different errors.

When the panel receives an error code, its source is displayed. At the same time a signal is heard. The signal varies depending on the seriousness of the error.



Alarms which can be remedied by users

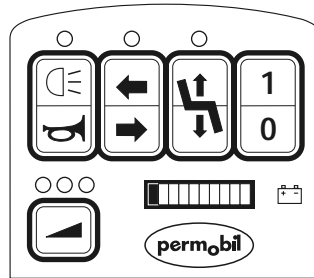
Errors which can be remedied by users (for example, “Charger connected” or “low battery voltage”) are presented in a simpler manner, without LED1-LED3. Only the battery scale, max. speed LEDs (LED4-LED6) and panel horn are used.



Low battery voltage

2 red dashes on the battery indicator flash and 6 short beeps are repeated at intervals of 2 minutes when the joystick is activated.

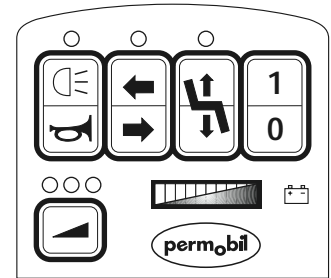
The batteries has to be recharged as soon as possible.



Critical battery voltage

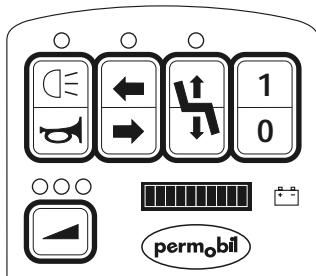
1 red dash on the battery indicator flashes and a continuous beep is heard when the joystick is activated. The chair cannot be driven.

Turn the wheelchair off/on. The wheelchair can be driven a shorter range before recharging the batteries.



Battery being charged

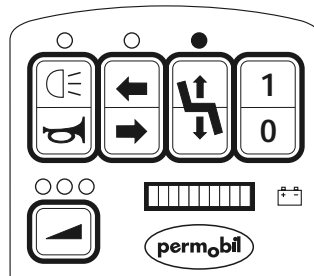
The battery indicator “flows” up and down. The chair cannot be driven.



Parking brake released or joystick deflected at startup

The entire battery scale flashes and short beeps are heard when the joystick is activated.

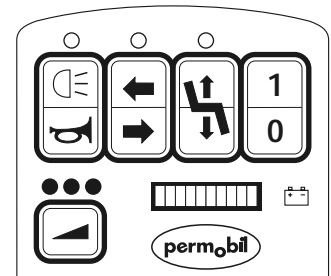
Check if the parking brake is released, turn the the wheelchair off/on.



Seat lift crush protection active

The seat up indication flashes. The crush protection is active, the seat lift cannot be lowered.

Check if something activates the crush protection.



Warm motors

Hot motors

Current speed indication flashes.

WARM: 6 short beeps at intervals of 2 min. when the joystick is activated.

HOT: continuous beeps for 10 seconds. The chair cannot be driven.

Errors which should not be dealt with by users

Errors which should not be dealt with by users (for example, a malfunctioning max. speed potentiometer, a program error in the drive electronics, etc.) are displayed as a complete error code, including a “unit identity” (LED1-LED6), plus battery scale and audible signal as described below.

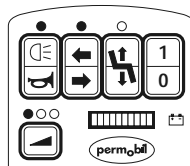
Errors are graded in three levels depending on their seriousness:

- WARNING =** Six short beeps and the LED combination for the unit, which are heard/displayed at intervals of a few minutes.
The LED combination is displayed flashing for a few seconds.
- PROBLEM =** Three long beeps and the LED combination for the unit are heard/displayed flashing at intervals of a few seconds until the error is dealt with.
The chair can be driven at low speed.
- ERROR =** 10-second beep, the LED combination for the unit is displayed flashing until the error is dealt with.
The chair cannot be driven.

Possible errors in various units

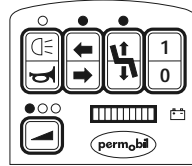
■ = LED Turned on ▨ = LED Flashing □ = LED Turned off

CCM (system)



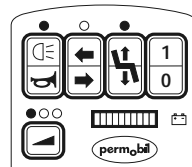
Level/Description	Error code	Probable cause
ERROR Mini-Config, checksum error	■ □ □ □ □ □ □ □	Memory error writing to Mini-Config memory or program updated.
ERROR Mini-Config parameter max.-min. error	■ ■ □ □ □ □ □ □	One or more parameters are outside their limit values. E.g. country code >10.
ERROR Memory flag error	■ ■ ■ □ □ □ □ □	Incorrect value in flag register. E.g. seat lift.
ERROR Mini-Config handshake error	■ ■ ■ ■ □ □ □ □	No response from output stage on startup. Program version conflict. CAN communication error.

Driving panel



Level/Description	Error code	Probable cause
WARNING Max. speed potentiometer	■ ■ □ □ □ □ □ □ □ □	Potentiometer found on startup but has been disconnected. Poor potentiometer contact.
ERROR Joystick	■ ■ ■ □ □ □ □ □ □ □	Joystick's center value or max. deflection outside permitted range.
ERROR DMS generation error	■ ■ ■ ■ ■ □ □ □ □ □	DMS value on bus different from DMS value from joystick.
WARNING Button error, panel	■ ■ ■ ■ ■ ■ □ □ □ □	A button on the panel has been pressed >2 min.
WARNING Button error, extra button box	■ ■ ■ ■ ■ ■ ■ □ □ □	A button on the extra button box has been pressed >2 min.
WARNING KEY generation error	■ ■ ■ ■ ■ ■ ■ □ □	For future protocol expansion.
ERROR CAN communication error	■ ■ ■ ■ ■ ■ ■ ■ □	Lost bus message. Poor contact. Poor/damp contacts. Hardware error.

Motor Controller



Level/Description	Error code	Probable cause
(critical battery voltage)	■ ■ □ □ □ □ □ □ □ □	("user-remedied error", stored with this error code in the error log)
PROBLEM Steering potentiometer (TRAX)	■ ■ ■ □ □ □ □ □ □ □	Incorrect value from the potentiometer in the steering. Check cables to servo steering.
(hot motors)	■ ■ ■ ■ ■ □ □ □ □ □	("user-remedied error", stored with this error code in the error log)
ERROR Program error	■ ■ ■ ■ ■ ■ □ □ □ □	Timeout in the main program's watchdog. (Report to Permobil support department.)
ERROR motor cable breakage	■ ■ ■ ■ ■ ■ ■ □ □	Cable breakage to left and/or right drive motor. May also be an error in the motor controller.
ERROR Motor controller error	■ ■ ■ ■ ■ ■ ■ ■ □	Internal error in the motor controller.
WARNING Grounding error	■ ■ ■ ■ ■ ■ ■ ■ ■	Electrical contact with the chassis. Check for crushed or damaged cables. Internally damaged bus cable.

KOALA, ENTRA

Error code log

The 47 last error codes are stored in the panel and are displayed if you hold down RIGHT INDICATORS when the chair is switched on. Error codes are displayed with an indication of the unit (LED1-LED6) and the error code (battery scale).

When the error code display is started, the most recent error is displayed. You step through the error codes by moving the joystick to the right/upwards (recent codes) or to the left/backwards (older codes).

ONE beep is heard at each step. When you reach the end (the oldest or more recent) of the error codes, TWO beeps are heard.

If you hold the joystick in one direction, the error codes are stepped through automatically. After two seconds, the step speed increases.

The entire error log can be deleted by holding down LEFT INDICATORS and moving the joystick backwards/downwards for a few seconds. The panel goes out when the log is empty. If the log is empty at the start of the error code display, the panel remains off and beeps twice.

The following alarms are not logged:

Low battery voltage, battery being charged, parking brake released, seat rotation out and warm motors.

(More may be added as new products and functions are developed).

TRAX

Settings

Parameters are chosen by pressing the LIGHTS, HORN, INDICATORS, SEAT LIFT buttons in 3 (TP1) or 4 (TP2) different pages.

The page is chosen by pressing the MAX. SPEED button.

The page (1-3) chosen is indicated by LED 4-6 (see table).

The function which is active is shown by LED 1-3 being permanently lit or flashing. Permanently lit indicates the upper button (for example, LIGHTS) and flashing indicates the lower button (for example, HORN).

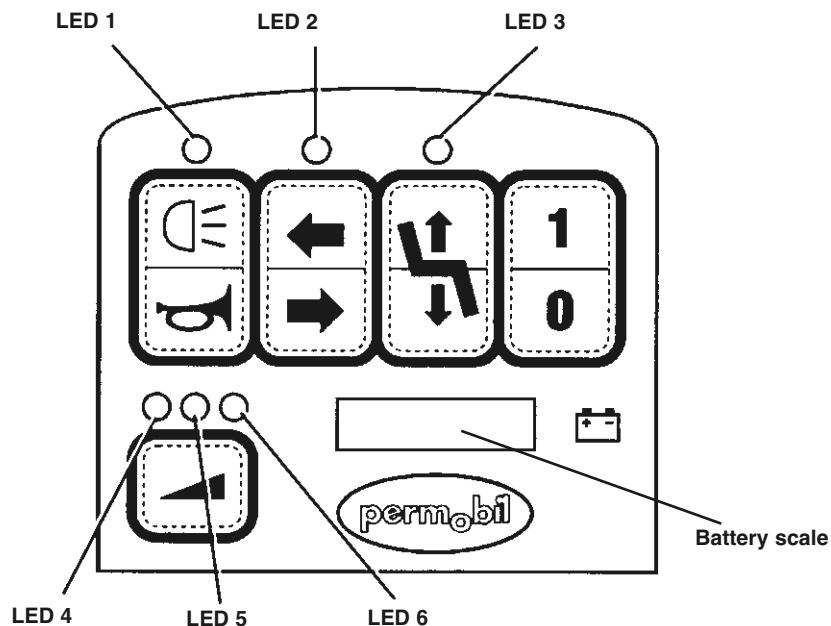
The value of a parameter is changed using the joystick. Moving the joystick to the right or upwards increases the parameter value. Moving the joystick to the left or downwards decreases the parameter value.

The value of the parameter in question can be seen on the BATTERY scale. The number of LEDs lit depends on the maximum value of the parameter. For all parameters, the entire battery scale lights up when the parameter has reached its maximum value.

A function is closed by pressing a different function button or by closing/aborting the Mini-Config program.

The type of electronics can be identified with help of the serial numbers, see table below.

	Motor controller	Panel
TP1	Pxxxx	Qxxxx
TP2	PAxxxx	QAxxxx



TRAX TP1

Page	Parameter	Designation	Parameter range	Std.	Setting
		Set STEER CORRECTION WHEN DRIVING.	0 - 20	10	
		Set COUNTRY CODE.	0 - 20	10	
		Set MAX. SPEED.	0 - 10	10	
		Set MAX. FORCE.	0 - 10	10	
		Set ACCELERATION.	0 - 10	6	
		Set WHEEL DIMENSIONS. *	0 - 10	6	
		Set SERVO STEERING.	0 - 1	1	
		Set BRAKING DISTANCE.	0 - 5	2	
		Set SEAT LIFT. **	0 - 1	1	
		Set SLEEP time.	0 - 10	3	
		Set SEAT SWIVEL. ***	1 - 3	1	
		Set SPASTIC.	0 - 3	0	
		Set DEADBAND.	0 - 5	0	
		Set SHORT JOYSTICK , X DIRECTION.	1 - 5	5	
		Set SHORT JOYSTICK , Y DIRECTION.	1 - 5	5	
		Set REVERSE JOYSTICK, X DIRECTION.	0 - 1	0	
		Set REVERSE JOYSTICK, Y DIRECTION.	0 - 1	0	
		Restore factory settings.	0	-	

● Permanently lit ● Flashing

Max. value: 20 = Lit in “half steps” with flashing LEDs.
 10 = 1 LED per increase of parameter value.
 5 = 2 LEDs per increase of parameter value.
 3 = A new colour per increase of parameter value.
 1 = Full battery scale lit up.

* Always has to be set according to present rear wheel dimension. See page 24.

** Used to set SEAT ROTATION, R, L, in previous versions.

*** Not used in previous versions.

TRAX TP2

Page	Parameter	Designation	Parameter range	Std.	Setting
		Set STEER CORRECTION WHEN DRIVING.	0 - 20	10	
		Set COUNTRY CODE.	0 - 20	10	
		Set MAX. SPEED.	0 - 10	10	
		Set MAX. FORCE.	0 - 10	10	
		Set ACCELERATION.	0 - 10	7	
		Set TURN ACCEL'N.	0 - 10	7	
		Set SERVO STEERING.	0 - 1	1	
		Set BRAKING DISTANCE.	0 - 5	2	
		Set SEAT LIFT.	0 - 1	1	
		Set AUTO-KILL time.	0 - 10	3	
		Set SEAT SWIVEL.	1 - 5	1	
		Set SPASTIC.	0 - 3	0	
		Set DEADBAND.	0 - 5	0	
		Set SHORT JOYSTICK , X DIRECTION.	1 - 5	5	
		Set SHORT JOYSTICK , Y DIRECTION.	1 - 5	5	
		Set REVERSE JOYSTICK, X DIRECTION.	0 - 1	0	
		Set REVERSE JOYSTICK, Y DIRECTION.	0 - 1	0	
		Set LOG RESPONSE, Y DIRECTION.	1 - 3	3	
		Set WHEEL DIMENSIONS. *	0 - 10	5	
		Set TURNSPEED.	1 - 10	7	
		Set LEVERMANSPEED.	1 - 10	5	
		N/A	0 - 20	10	
		Set LEVERMANMOD.	0 - 2	0	
		Restore factory settings.	0	-	

● Permanently lit ● Flashing

Max. value: 20 = Lit in "half steps" with flashing LEDs.
 10 = 1 LED per increase of parameter value.
 5 = 2 LEDs per increase of parameter value.
 3 = A new colour per increase of parameter value.
 1 = Full battery scale lit up.

* Always has to be set according to present rear wheel dimension. See page 24.

TRAX

Parameters

Steer correction when driving

Trim parameter for the motors. Used if the chair is turning although the joystick is straight ahead. Can be set 0-20, where everything less than 10 means that the chair steers more to the left.

In order to be able to represent 20 values on a display with only 10 LEDs, the following "code" is used: the LEDs either flash or light up permanently, where flashing means 1 and permanently lit means 2.

Example 1: Four LEDs permanently lit means the parameter value 8 (4x2).

Example 2: Four LEDs permanently lit and one flashing means the parameter value 9 (4x2+1).

Joystick right/upwards = Increase parameter value, turn right.

Joystick left/downwards = Decrease parameter value, turn left.

The untrimmed parameter is 10.

Country code

Sets the country for which the chair has been made.

This affects the chair's speed when turning, reversing and driving normally.

Set in the same way as STEER CORRECTION WHEN DRIVING.

The standard value is 10, Sweden/Rest of the world.

NB! The parameter can be set to any value in the range 0-20. However, only 10, 9 and 8 are valid settings.

Parameter	Country
10	Sweden/USA(Max. Speed. 9 mph)/Rest of the world.
9	Norway/USA(Max. Speed. 6 mph)
8	Germany

Max. speed

Can be set from 10% to 100% of the highest max. speed (speed potentiometer value). 10 is max. speed (100%).

Use the joystick to select.

Joystick right/upwards = Increase speed.

Joystick left/downwards = Decrease speed.

The standard value is 10 (100%).

Max. force

Sets the maximum torque on the wheels. Use the joystick to select.

Sets the maximum torque on the wheels.

Use the joystick to select.

Joystick right/upwards = Increase force.

Joystick left/downwards = Decrease force.

The standard value is 10.

Acceleration

Sets how fast the chair is to accelerate.

Joystick right/upwards = Increase acceleration.

Joystick left/downwards = Decrease acceleration.

The standard value is 7.

Turn Accel'n

Sets how quickly or slowly you wish the frontwheels to turn.

Joystick right/upwards = Increase turn Accel'n.

Joystick left/downwards = Decrease turn Accel'n.

The standard value is 7.

Servo steering

States whether the chair has servo steering or manual steering. Servo steering (parameter value 1) is standard.

NB! Changing to manual steering will mean user will NOT be able to steer with the joystick.

Braking distance

Sets the braking distance. The standard setting is 2.

Parameter value	Braking distance	Braking distance
	Max. Speed. 6 mph	Max. Speed. 9 mph
0	1,5 m	3,0 m
1	1,6 m	3,2 m
2	1,7 m	3,4 m
3	1,8 m	3,6 m
4	1,9 m	3,8 m
5	2,0 m	4,0 m

NB!

The braking distance values are approximate.

Seat lift

States whether a seat lift is fitted on the chair.

Joystick right/upwards = Seat lift fitted (battery scale lights up)

Joystick left/downwards = No seat lift (battery scale off)

The standard setting is seat lift fitted.

Sleep

Sets the delay before the chair switches off if the joystick is not activated.

Parameter value	Delay
0	10 seconds
1-9	10-90 minutes
10	Infinite

The standard value is 30 minutes.

Seat swivel

Indicates the type of electric seat rotation.

1 = No electric seat rotation.

2 = Electric seat rotation to the left.

3 = Electric seat rotation to the right.

No electric seat rotation is standard.

Spastic

Four settings for how much "play" there is to be for the steering. (Play= deadband of joystick detection in left/right direction).

Joystick right/upwards = Increase play.

Joystick left/downwards = Decrease play.

0% play= Battery scale off (standard), i.e. switched off.

15% play= Red part of battery scale lit up.

25% play= Red + yellow parts of battery scale lit up.

40% play= Entire battery scale lit up.

0% play is standard.

Deadband

Sets the size of the deadband forwards/backwards; 0-20% of max. joystick deflection in steps of 4% units.

Joystick right/upwards = Increase deadband by 4% units.

Joystick left/downwards = Decrease deadband by 4% units.

0% deadband is standard.

NB! In order to enable access to the joystick Menu features through using the joystick, the deadband must be set to at least value 1 (2 LEDs)

Short joystick, X direction

Shorter joystick limits in the X direction for steering, leverman entry and stepping through menus, etc.

20 -100% of mechanical joystick movement required to achieve full joystick deflection.

Joystick right/upwards = Increase parameter.

Joystick left/downwards = Decrease parameter.

100% is the standard value.

Short joystick, Y direction

As for SHORT JOYSTICK, X DIRECTION, but for shorter joystick limits in the Y direction for speed.

100% is the standard value.

Reverse joystick, X direction

Reverses the direction of the joystick's X axis, i.e. the chair turns to the left when the joystick is moved to the right.

Joystick right/upwards = Reverse joystick on (inverted joystick deflection). Battery scale lit up.

Joystick left/downwards = Reverse joystick off (normal driving). Battery scale off.

Normal driving (NOT reverse joystick) is standard.

Reverse joystick, Y direction

Reverses the direction of the joystick's Y axis, i.e. the chair reverses when the joystick is moved forwards.

Joystick right/upwards = Reverse joystick on (inverted joystick deflection). Battery scale lit up.

Joystick left/downwards = Reverse joystick off (normal driving). Battery scale off.

Normal driving (NOT reverse joystick) is standard.

Log Response Y direction

Produces different logarithmic values for the joystick in Y direction. Can be set 1-3.

Joystick right=More logarithmic joystick (better control at low speed)

Joystick left=More linear joystick (better control at high speed)

Standard is 3.

Wheel dimensions

Sets the dimensions of the rear wheels. This affects speed and torque. The standard setting is 5.

NB! This parameter always has to be set according to present rear wheel dimensions.

Parameter value	Wheel dimensions
3	3.00-10, Public road
5	3.50-10, Offroad

NB! The parameter can be set to any value in the range 1-10. However, only 5 and 3 are valid settings.

Turning speed

Sets how much the wheelchair should turn in speed

Use the joystick to choose.

Joystick right = Increase parameter.

Joystick left = Decrease parameter.

The standard value is 7.

Leverman speed

NB! This parameter setting is not implemented in Ver. 2.x

Sets how fast you can step between settings in leverman

Use the joystick to choose.

Joystick right = Increase parameter.

Joystick left = Decrease parameter.

The standard value is 5.

Leverman mode

NB! This parameter setting is not implemented in Ver. 2.x

Can be set 0-2.

Use the joystick to choose parameter setting.

Joystick right = Increase parameter.

Joystick left = Decrease parameter.

Parameter value	Leverman mode
0	No leverman
1	Leverman through the light button or Joystick left.
2	Leverman through the light button, Joystick left, or two fast joystick movements backwards.

The standard value is 0.

Restore factory settings

Joystick right/upwards OR left/downwards = The battery scale begins to go out. This means that the factory settings are being restored.

These are saved if the ON button is pressed (the chair starts immediately) or ignored if the OFF button is pressed (the chair is switched off).

TRAX

Alarms and Error Codes

Alarm categorization:

Alarms can belong either to the “user-remedied error” category or the “engineer-remedied error” category.

Check first whether an alarm belongs to the “user-remedied error” category. These alarms/warnings are indicated without unit affiliation. These “user-remedied errors” are indicated by the battery scale flashing/“flowing” or in some cases by one/some of the LEDs flashing. If both the battery scale and some of the LEDs flash, the alarm belongs to the “engineer-remedied error” category.

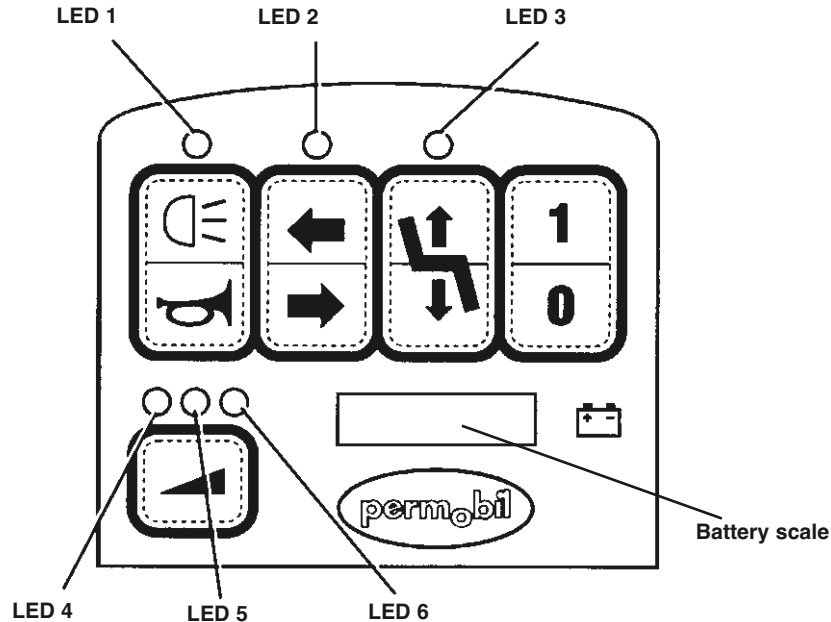
In those cases in which an alarm belongs to the “engineer-remedied error” category, i.e. a combination of flashing LEDs and battery scale, the combination of the LEDs indicates the unit producing the alarm, while the battery scale indicates which alarm the unit is producing (TP1:1 -10) (TP2:1-20). These indications are called error codes.

Error codes

Each part of the electronics on the chair (for example, panel, motor controller, etc.) can, in the event of an alarm, transmit error codes which are displayed on the panel’s LEDs (LED 1 - LED 6) and battery scale.

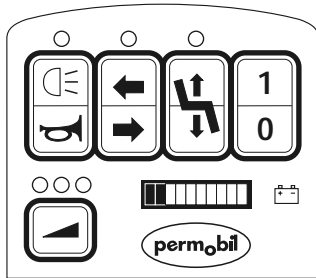
LED 1 to LED 6 show which part of the chair’s electronics has a problem. The battery scale LEDs 1-10 show which error has occurred.

When the panel receives an error code, its source is displayed. At the same time a signal is heard. The signal varies depending on the seriousness of the error.



Alarms which can be remedied by users

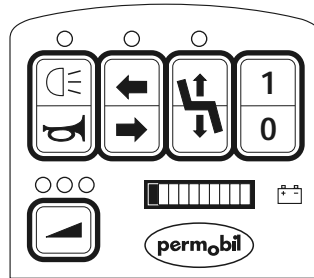
Errors which can be remedied by users (for example, “Charger connected” or “low battery voltage”) are presented in a simpler manner, without LED1-LED3. Only the battery scale, max. speed LEDs (LED4-LED6) and panel horn are used.



Low battery voltage

2 red dashes on the battery indicator flash and 6 short beeps are repeated at intervals of 2 minutes when the joystick is activated.

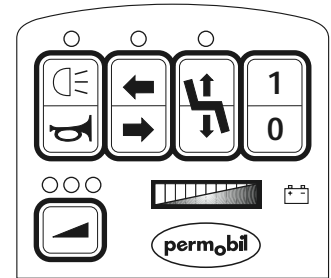
The batteries has to be recharged as soon as possible.



Critical battery voltage

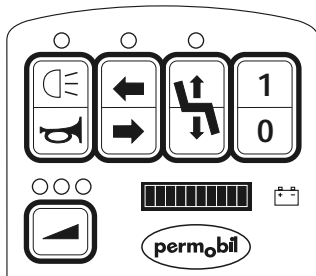
1 red dash on the battery indicator flashes and a continuous beep is heard when the joystick is activated. The chair cannot be driven.

Turn the wheelchair off/on. The wheelchair can be driven a shorter range before recharging the batteries.



Battery being charged

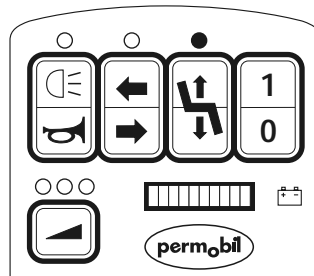
The battery indicator “flows” up and down. The chair cannot be driven.



Parking brake released or joystick deflected at startup

The entire battery scale flashes and short beeps are heard when the joystick is activated.

Check if the parking brake is released, turn the the wheelchair off/on.



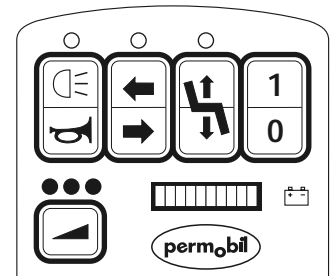
Seat swivel out (TRAX) Seat lift crush protection active

The seat up indication flashes. If crush protection is active, the seat lift cannot be lowered.

If the seat rotation is out, the chair cannot be driven.

Check if something activates the crush protection.

Check if the seat rotation is out.



Warm motors Hot motors

Current speed indication flashes.

WARM: 6 short beeps at intervals of 2 min. when the joystick is activated.

HOT: continuous beeps for 10 seconds. The chair cannot be driven before cooling off.

Errors which should not be dealt with by users

Errors which should not be dealt with by users (for example, a malfunctioning max. speed potentiometer, a program error in the drive electronics, etc.) are displayed as a complete error code, including a “unit identity” (LED1-LED6), plus battery scale and audible signal as described below.

Errors are graded in three levels depending on their seriousness:

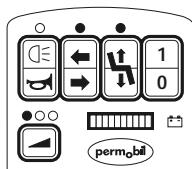
WARNING = Six short beeps and the LED combination for the unit, which are heard/displayed at intervals of a few minutes.
The LED combination is displayed flashing for a few seconds.

ERROR = 10-second beep, the LED combination for the unit is displayed flashing until the error is dealt with.
The chair cannot be driven.

Possible errors in various units

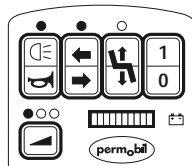
■ = LED Turned on ▩ = LED Flashing □ = LED Turned off

Driving panel



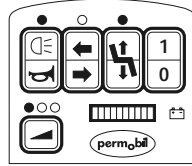
Level/Description	Error code	Probable cause
WARNING Max. speed potentiometer	■ ■ □ □ □ □ □ □	Potentiometer found on startup but has been disconnected. Poor potentiometer contact.
ERROR Joystick	■ ■ ■ □ □ □ □ □	Joystick's center value or max. deflection outside permitted range.
ERROR DMS generation error	■ ■ ■ ■ □ □ □ □	DMS value on bus different from DMS value from joystick.
WARNING Button error, panel	■ ■ ■ ■ ■ □ □ □	A button on the panel has been pressed >2 min.
WARNING Button error, extra button box	■ ■ ■ ■ ■ ■ □ □	A button on the extra button box has been pressed >2 min.
WARNING KEY generation error	■ ■ ■ ■ ■ ■ ■ □ □	For future protocol expansion.
ERROR CAN communication error	■ ■ ■ ■ ■ ■ ■ ■ □	Lost bus message. Poor contact. Poor/damp contacts. Hardware error.

CCM (system)



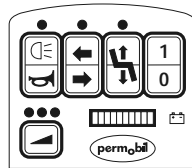
Level/Description	Error code	Probable cause
ERROR Mini-Config, checksum error	■ □ □ □ □ □ □ □	Memory error writing to Mini-Config memory or program updated.
ERROR Mini-Config parameter max.-min. error	■ ■ □ □ □ □ □ □	One or more parameters are outside their limit values. E.g. country code >10.
ERROR Memory flag error	■ ■ ■ □ □ □ □ □	Incorrect value in flag register. E.g. seat lift.
ERROR Mini-Config handshake error	■ ■ ■ ■ □ □ □ □	No response from output stage on startup. Program version conflict. CAN communication error.
ERROR OS error	■ ■ ■ ■ ■ ■ ■ □ □	OS error (Report to Permobil support department.)

Motor Controller



Level/Description	Error code	Probable cause
(critical battery voltage)	■■■■■■■■■■	("user-remedied error", stored with this error code in the error log)
PROBLEM Steering potentiometer (TRAX)	■■■■■■■■■■	Incorrect value from the potentiometer in the steering. Check cables to servo steering.
(hot motors)	■■■■■■■■■■	("user-remedied error", stored with this error code in the error log)
ERROR Program error	■■■■■■■■■■	Timeout in the main program's watchdog. (Report to Permobil support department.)
ERROR TP1:Motor cable breakage TP2:Left motor cable breakage	■■■■■■■■■■	Cable breakage to left and/or right drive motor. May also be an error in the motor controller.
ERROR TP1:Motor controller error TP2:Right motor cable breakage	■■■■■■■■■■	Internal error in the motor controller.
WARNING Grounding error	■■■■■■■■■■	Electrical contact with the chassis. Check for crushed or damaged cables. Internally damaged bus cable.

Electronics



Level/Description	Error code	Probable cause
ERROR Magnetic wheel lock	■■■■■■■■■■	The drive wheels has been turning, without signals from the joystick. Check the magnetic wheel locks.
ERROR Magnetic wheel lock	■■■■■■■■■■	The drive wheels has been turning, without signals from the joystick. Check the magnetic wheel locks.
ERROR Drive motor	■■■■■■■■■■	Drive motor brushes or cabling out of order.
ERROR Drive motor	■■■■■■■■■■	Drive motor brushes or cabling out of order.
ERROR Left drive motor	■■■■■■■■■■	Left drive motor or cabling short cutted.
ERROR Right drive motor	■■■■■■■■■■	Right drive motor or cabling short cutted.
ERROR Motor Controller	■■■■■■■■■■	Wheelchair turned on with overheated motor controller. Check cabling between control panel and motor controller.
ERROR SLS Drive stage	■■■■■■■■■■	Switched 24v short cutted with the unswitched.
ERROR Motor Controller	■■■■■■■■■■	Overvoltage protector activated. Check batteries, conctions and main fuse.
ERROR	Other error codes	Electronics error

Error code log

The 47 last error codes are stored in the panel and are displayed if you hold down RIGHT INDICATORS when the chair is switched on. Error codes are displayed with an indication of the unit (LED1-LED6) and the error code (battery scale).

When the error code display is started, the most recent error is displayed. You step through the error codes by moving the joystick to the right/upwards (recent codes) or to the left/backwards (older codes).

ONE beep is heard at each step. When you reach the end (the oldest or more recent) of the error codes, TWO beeps are heard.

If you hold the joystick in one direction, the error codes are stepped through automatically. After two seconds, the step speed increases.

The entire error log can be deleted by holding down LEFT INDICATORS and moving the joystick backwards/downwards for a few seconds. The panel goes out when the log is empty. If the log is empty at the start of the error code display, the panel remains off and beeps twice.

The following alarms are not logged:

Low battery voltage, battery being charged, parking brake released, seat rotation out and warm motors.

(More may be added as new products and functions are developed).

X850

Settings

Parameters are chosen by pressing the LIGHTS, HORN, INDICATORS, SEAT LIFT buttons in 3 (TP1) or 4 (TP2) different pages.

The page is chosen by pressing the MAX. SPEED button.

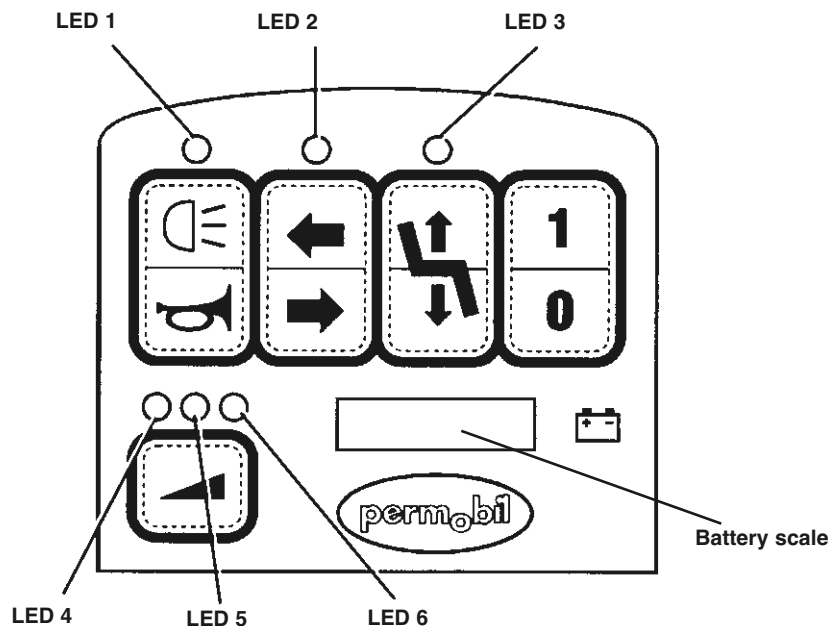
The page (1-3) chosen is indicated by LED 4-6 (see table).

The function which is active is shown by LED 1-3 being permanently lit or flashing. Permanently lit indicates the upper button (for example, LIGHTS) and flashing indicates the lower button (for example, HORN).

The value of a parameter is changed using the joystick. Moving the joystick to the right or upwards increases the parameter value. Moving the joystick to the left or downwards decreases the parameter value.

The value of the parameter in question can be seen on the BATTERY scale. The number of LEDs lit depends on the maximum value of the parameter. For all parameters, the entire battery scale lights up when the parameter has reached its maximum value.

A function is closed by pressing a different function button or by closing/aborting the Mini-Config program.



X850

Page	Parameter	Designation	Parameter range	Std.	Setting
		Set STEER CORRECTION WHEN DRIVING.	0 - 20	10	
		Set COUNTRY CODE.	0 - 20	10	
		Set MAX. SPEED.	0 - 10	10	
		Set MAX. FORCE.	0 - 10	10	
		Set ACCELERATION.	0 - 10	7	
		Set TURN ACCEL'N.	0 - 10	7	
		Set SERVO STEERING.	0 - 1	1	
		Set BRAKING DISTANCE.	0 - 5	2	
		Set SEAT LIFT.	0 - 1	1	
		Set AUTO-KILL time.	0 - 10	3	
		Set SEAT SWIVEL/SEAT TILT	1 - 5	1	
		Set SPASTIC.	0 - 3	0	
		Set DEADBAND.	0 - 5	0	
		Set SHORT JOYSTICK , X DIRECTION.	1 - 5	5	
		Set SHORT JOYSTICK , Y DIRECTION.	1 - 5	5	
		Set REVERSE JOYSTICK, X DIRECTION.	0 - 1	0	
		Set REVERSE JOYSTICK, Y DIRECTION.	0 - 1	0	
		Set LOG RESPONSE, Y DIRECTION.	1 - 3	3	
		Set WHEEL DIMENSIONS. *	0 - 10	5	
		Set TURNSPEED.	1 - 10	7	
		Set LEVERMANSPEED.	1 - 10	5	
		N/A	0 - 20	10	
		Set LEVERMANMOD.	0 - 2	0	
		Restore factory settings.	0	-	

● Permanently lit ● Flashing

Max. value: 20 = Lit in "half steps" with flashing LEDs.
 10 = 1 LED per increase of parameter value.
 5 = 2 LEDs per increase of parameter value.
 3 = A new colour per increase of parameter value.
 1 = Full battery scale lit up.

* Always has to be set according to present rear wheel dimension. See page 36.

X850

Parameters

Steer correction when driving

Trim parameter for the motors. Used if the chair is turning although the joystick is straight ahead. Can be set 0-20, where everything less than 10 means that the chair steers more to the left.

In order to be able to represent 20 values on a display with only 10 LEDs, the following "code" is used: the LEDs either flash or light up permanently, where flashing means 1 and permanently lit means 2.

Example 1: Four LEDs permanently lit means the parameter value 8 (4x2).

Example 2: Four LEDs permanently lit and one flashing means the parameter value 9 (4x2+1).

Joystick right/upwards = Increase parameter value, turn right.

Joystick left/downwards = Decrease parameter value, turn left.

The untrimmed parameter is 10.

Country code

Sets the country for which the chair has been made.

This affects the chair's speed when turning, reversing and driving normally.

Set in the same way as STEER CORRECTION WHEN DRIVING.

The standard value is 10, Sweden/Rest of the world.

NB! The parameter can be set to any value in the range 0-20. However, only 10, 9 and 8 are valid settings.

Parameter	Country
10	Sweden/USA(Max. Speed. 9 mph)/Rest of the world.
9	Norway/USA(Max. Speed. 6 mph)
8	Germany

Max. speed

Can be set from 10% to 100% of the highest max. speed (speed potentiometer value). 10 is max. speed (100%).

Use the joystick to select.

Joystick right/upwards = Increase speed.

Joystick left/downwards = Decrease speed.

The standard value is 10 (100%).

Max. force

Sets the maximum torque on the wheels. Use the joystick to select.

Sets the maximum torque on the wheels.

Use the joystick to select.

Joystick right/upwards = Increase force.

Joystick left/downwards = Decrease force.

The standard value is 10.

Acceleration

Sets how fast the chair is to accelerate.

Joystick right/upwards = Increase acceleration.

Joystick left/downwards = Decrease acceleration.

The standard value is 7.

Turn Accel'n

Sets how quickly or slowly you wish the frontwheels to turn.

Joystick right/upwards = Increase turn Accel'n.

Joystick left/downwards = Decrease turn Accel'n.

The standard value is 7.

Servo steering

States whether the chair has servo steering or manual steering. Servo steering (parameter value 1) is standard.

NB! Changing to manual steering will mean user will NOT be able to steer with the joystick.

Braking distance

Sets the braking distance. The standard setting is 2.

Parameter value	Braking distance	Braking distance
	Max. Speed. 6 mph	Max. Speed. 9 mph
0	1,5 m	3,0 m
1	1,6 m	3,2 m
2	1,7 m	3,4 m
3	1,8 m	3,6 m
4	1,9 m	3,8 m
5	2,0 m	4,0 m

Seat lift

States whether a seat lift is fitted on the chair.

Joystick right/upwards = Seat lift fitted (battery scale lights up)

Joystick left/downwards = No seat lift (battery scale off)

The standard setting is seat lift fitted.

NB!

The braking distance values are approximate.

Sleep

Sets the delay before the chair switches off if the joystick is not activated.

Parameter value	Delay
0	10 seconds
1-9	10-90 minutes
10	Infinite

The standard value is 30 minutes.

Seat swivel/Seat Tilt

Indicates the type of electric seat swivel and seat tilt.

- 1 = Manual seat swivel (Standard).
- 2 = Electric seat swivel. (Not for TS seat)
- 3 = No electric seat swivel and no electric seat tilt
- 4 = Electric seat tilt
- 5 = Electric seat swivel (TS seat only)

Spastic

Four settings for how much "play" there is to be for the steering. (Play= deadband of joystick detection in left/right direction).

Joystick right/upwards = Increase play.

Joystick left/downwards = Decrease play.

0% play= Battery scale off (standard), i.e. switched off.

15% play= Red part of battery scale lit up.

25% play= Red + yellow parts of battery scale lit up.

40% play= Entire battery scale lit up.

0% play is standard.

Deadband

Sets the size of the deadband forwards/backwards; 0-20% of max. joystick deflection in steps of 4% units.

Joystick right/upwards = Increase deadband by 4% units.

Joystick left/downwards = Decrease deadband by 4% units.

0% deadband is standard.

NB! In order to enable access to the joystick Menu features through using the joystick, the deadband must be set to at least value 1 (2 LEDs)

Short joystick, X direction

Shorter joystick limits in the X direction for steering, leverman entry and stepping through menus, etc.

20 -100% of mechanical joystick movement required to achieve full joystick deflection.

Joystick right/upwards = Increase parameter.

Joystick left/downwards = Decrease parameter.

100% is the standard value.

Short joystick, Y direction

As for SHORT JOYSTICK, X DIRECTION, but for shorter joystick limits in the Y direction for speed.

100% is the standard value.

Reverse joystick, X direction

Reverses the direction of the joystick's X axis, i.e. the chair turns to the left when the joystick is moved to the right.

Joystick right/upwards = Reverse joystick on (inverted joystick deflection). Battery scale lit up.

Joystick left/downwards = Reverse joystick off (normal driving). Battery scale off.

Normal driving (NOT reverse joystick) is standard.

Reverse joystick, Y direction

Reverses the direction of the joystick's Y axis, i.e. the chair reverses when the joystick is moved forwards.

Joystick right/upwards = Reverse joystick on (inverted joystick deflection). Battery scale lit up.

Joystick left/downwards = Reverse joystick off (normal driving). Battery scale off.

Normal driving (NOT reverse joystick) is standard.

Log Response Y direction

Produces different logarithmic values for the joystick in Y direction. Can be set 1-3.

Joystick right=More logarithmic joystick (better control at low speed)

Joystick left=More linear joystick (better control at high speed)

Standard is 3.

Wheel dimensions

Sets the dimensions of the rear wheels. This affects speed and torque. The standard setting is 5.

NB! This parameter always has to be set according to present rear wheel dimensions.

Parameter value	Wheel dimensions
3	3.00-10
5	3.50-10

NB! The parameter can be set to any value in the range 1-10. However, only 5 and 3 are valid settings.

Turning speed

Sets how much the wheelchair should turn in speed

Use the joystick to choose.

Joystick right = Increase parameter.

Joystick left = Decrease parameter.

The standard value is 7.

Leverman speed

Sets how fast you can step between settings in leverman

Use the joystick to choose.

Joystick right = Increase parameter.

Joystick left = Decrease parameter.

The standard value is 5.

Leverman mode

Can be set 0-2.

Use the joystick to choose parameter setting.

Joystick right = Increase parameter.

Joystick left = Decrease parameter.

Parameter value	Leverman mode
0	No leverman
1	Leverman through the light button or Joystick left.
2	Leverman through the light button, Joystick left, or two fast joystick movements backwards.

The standard value is 0.

Restore factory settings

Joystick right/upwards OR left/downwards = The battery scale begins to go out. This means that the factory settings are being restored.

These are saved if the ON button is pressed (the chair starts immediately) or ignored if the OFF button is pressed (the chair is switched off).

X850

Alarms and Error Codes

Alarm categorization:

Alarms can belong either to the “user-remedied error” category or the “engineer-remedied error” category.

Check first whether an alarm belongs to the “user-remedied error” category. These alarms/warnings are indicated without unit affiliation. These “user-remedied errors” are indicated by the battery scale flashing/“flowing” or in some cases by one/some of the LEDs flashing. If both the battery scale and some of the LEDs flash, the alarm belongs to the “engineer-remedied error” category.

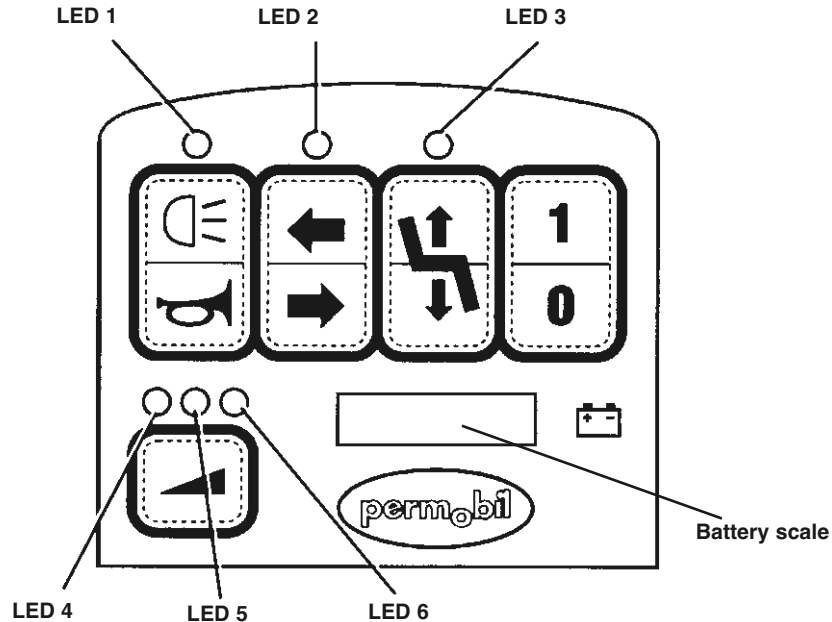
In those cases in which an alarm belongs to the “engineer-remedied error” category, i.e. a combination of flashing LEDs and battery scale, the combination of the LEDs indicates the unit producing the alarm, while the battery scale indicates which alarm the unit is producing (1-20). These indications are called error codes.

Error codes

Each part of the electronics on the chair (for example, panel, motor controller, etc.) can, in the event of an alarm, transmit error codes which are displayed on the panel’s LEDs (LED 1 - LED 6) and battery scale.

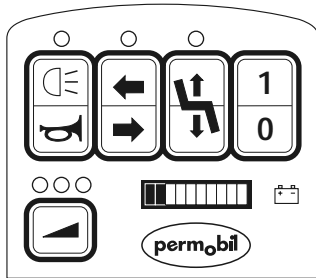
LED 1 to LED 6 show which part of the chair’s electronics has a problem. The battery scale LEDs 1-10 show which error has occurred.

When the panel receives an error code, its source is displayed. At the same time a signal is heard. The signal varies depending on the seriousness of the error.



Alarms which can be remedied by users

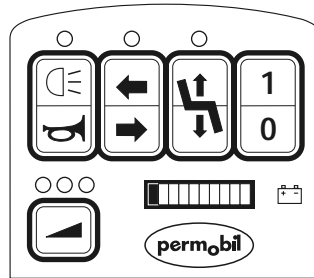
Errors which can be remedied by users (for example, “Charger connected” or “low battery voltage”) are presented in a simpler manner, without LED1-LED3. Only the battery scale, max. speed LEDs (LED4-LED6) and panel horn are used.



Low battery voltage

2 red dashes on the battery indicator flash and 6 short beeps are repeated at intervals of 2 minutes when the joystick is activated.

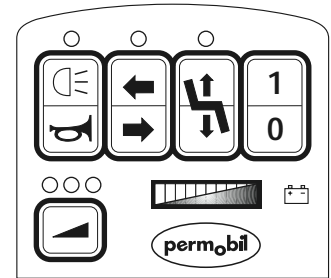
The batteries has to be recharged as soon as possible.



Critical battery voltage

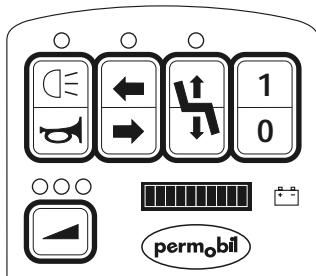
1 red dash on the battery indicator flashes and a continuous beep is heard when the joystick is activated. The chair cannot be driven.

Turn the wheelchair off/on. The wheelchair can be driven a shorter range before recharging the batteries.



Battery being charged

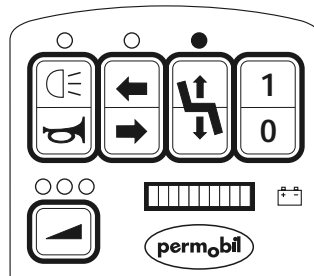
The battery indicator “flows” up and down. The chair cannot be driven.



Parking brake released or joystick deflected at startup

The entire battery scale flashes and short beeps are heard when the joystick is activated.

Check if the parking brake is released, turn the the wheelchair off/on.



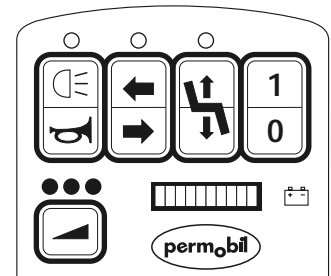
**Seat swivel out (TRAX)
Seat lift crush protection active**

The seat up indication flashes. If crush protection is active, the seat lift cannot be lowered.

If the seat rotation is out, the chair cannot be driven.

Check if something activates the crush protection.

Check if the seat rotation is out.



**Warm motors
Hot motors**

Current speed indication flashes.

WARM: 6 short beeps at intervals of 2 min. when the joystick is activated.

HOT: continuous beeps for 10 seconds. The chair cannot be driven before cooling off.

Errors which should not be dealt with by users

Errors which should not be dealt with by users (for example, a malfunctioning max. speed potentiometer, a program error in the drive electronics, etc.) are displayed as a complete error code, including a “unit identity” (LED1-LED6), plus battery scale and audible signal as described below.

Errors are graded in three levels depending on their seriousness:

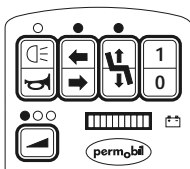
WARNING = Six short beeps and the LED combination for the unit, which are heard/displayed at intervals of a few minutes.
The LED combination is displayed flashing for a few seconds.

ERROR = 10-second beep, the LED combination for the unit is displayed flashing until the error is dealt with.
The chair cannot be driven.

Possible errors in various units

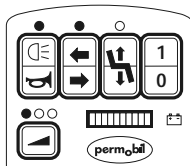
■ = LED Turned on ▨ = LED Flashing □ = LED Turned off

Driving panel



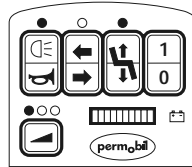
Level/Description	Error code	Probable cause
WARNING Max. speed potentiometer	■ ■ □ □ □ □ □ □	Potentiometer found on startup but has been disconnected. Poor potentiometer contact.
ERROR Joystick	■ ■ ■ □ □ □ □ □ □ □	Joystick's center value or max. deflection outside permitted range.
ERROR DMS generation error	■ ■ ■ ■ ■ □ □ □ □ □	DMS value on bus different from DMS value from joystick.
WARNING Button error, panel	■ ■ ■ ■ ■ ■ □ □ □ □	A button on the panel has been pressed >2 min.
WARNING Button error, extra button box	■ ■ ■ ■ ■ ■ ■ □ □ □	A button on the extra button box has been pressed >2 min.
WARNING KEY generation error	■ ■ ■ ■ ■ ■ ■ ■ □ □	For future protocol expansion.
ERROR CAN communication error	■ ■ ■ ■ ■ ■ ■ ■ ■ □	Lost bus message. Poor contact. Poor/damp contacts. Hardware error.

CCM (system)



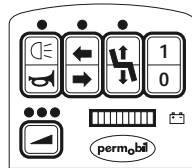
Level/Description	Error code	Probable cause
ERROR Mini-Config, checksum error	■ □ □ □ □ □ □ □ □ □	Memory error writing to Mini-Config memory or program updated.
ERROR Mini-Config parameter max.-min. error	■ ■ □ □ □ □ □ □ □ □	One or more parameters are outside their limit values. E.g. country code >10.
ERROR Memory flag error	■ ■ ■ □ □ □ □ □ □ □	Incorrect value in flag register. E.g. seat lift.
ERROR Mini-Config handshake error	■ ■ ■ ■ □ □ □ □ □ □	No response from output stage on startup. Program version conflict. CAN communication error.
ERROR OS error	■ ■ ■ ■ ■ ■ ■ ■ □ □	OS error (Report to Permobil support department.)

Motor Controller



Level/Description	Error code	Probable cause
(critical battery voltage)	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	("user-remedied error", stored with this error code in the error log)
PROBLEM Steering potentiometer (TRAX)	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Incorrect value from the potentiometer in the steering. Check cables to servo steering.
(hot motors)	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	("user-remedied error", stored with this error code in the error log)
ERROR Program error	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Timeout in the main program's watchdog. (Report to Permobil support department.)
ERROR Left motor cable breakage	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Cable breakage to left and/or right drive motor. May also be an error in the motor controller.
ERROR Right motor cable breakage	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Internal error in the motor controller.
WARNING Grounding error	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Electrical contact with the chassis. Check for crushed or damaged cables. Internally damaged bus cable.

Electronics



Level/Description	Error code	Probable cause
ERROR Magnetic wheel lock	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	The drive wheels has been turning, without signals from the joystick. Check the magnetic wheel locks.
ERROR Magnetic wheel lock	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	The drive wheels has been turning, without signals from the joystick. Check the magnetic wheel locks.
ERROR Drive motor	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Drive motor brushes or cabling out of order.
ERROR Drive motor	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Drive motor brushes or cabling out of order.
ERROR Left drive motor	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Left drive motor or cabling short cutted.
ERROR Right drive motor	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Right drive motor or cabling short cutted.
ERROR Motor Controller	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Wheelchair turned on with overheated motor controller. Check cabling between control panel and motor controller.
ERROR SLS Drive stage	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Switched 24v short cutted with the unswitched.
ERROR Motor Controller	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Overvoltage protector activated. Check batteries, conctions and main fuse.
ERROR	Other error codes	Electronics error

Error code log

The 47 last error codes are stored in the panel and are displayed if you hold down RIGHT INDICATORS when the chair is switched on. Error codes are displayed with an indication of the unit (LED1-LED6) and the error code (battery scale).

When the error code display is started, the most recent error is displayed. You step through the error codes by moving the joystick to the right/upwards (recent codes) or to the left/backwards (older codes).

ONE beep is heard at each step. When you reach the end (the oldest or more recent) of the error codes, TWO beeps are heard.

If you hold the joystick in one direction, the error codes are stepped through automatically. After two seconds, the step speed increases.

The entire error log can be deleted by holding down LEFT INDICATORS and moving the joystick backwards/downwards for a few seconds. The panel goes out when the log is empty. If the log is empty at the start of the error code display, the panel remains off and beeps twice.

The following alarms are not logged:

Low battery voltage, battery being charged, parking brake released, seat rotation out and warm motors.

(More may be added as new products and functions are developed).



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