

SMALO LX2/PX2 HMI User Manual



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Introduction

Manufacturer Information

Darad Innovation Corporation is a company located in Taiwan. We are committed to developing products that feature innovative ideas and structures.

Product Description

Product Description:	Stem Integrated HMI
Trademark:	SMALO
Type Designation:	60.Y2XHM.001 / 60.Y3BHM.001

Support Information

Whenever you need professional support, please don't hesitate to contact us!

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Copyright Information

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SMALO's HMI

HMI Guide

1. Smart mode
2. Speed/Code Number
3. Battery indicator
4. Warning code
5. Bluetooth
6. Battery charging
7. Electric lock on
8. Battery level
9. Error code



How to Power ON/OFF

Typically, the HMI turns on when you turn on the e-bike's power. (The figure below shows how to turn on SMALO LX2's power. SMALO PX2 can be powered on the same way, with the power button at a similar location—top tube.)



Press the power button to turn ON. Long press to turn OFF your LX2.

Detailed Icon Explanations

	Smart Mode	On by system default. Icon disappears when there is no power assistance.
	Bluetooth	When e-bike is connected to user's smart phone.
	Electric Lock On	When the e-bike is on and locked.
	Speed / Code Number	Displays current speed or warning/error code number.
	Speed Unit	Displays speed unit of choice, can be changed via app.
	Battery	Battery icon, which blinks when battery is almost at 0%.
	Battery Capacity / Passcode Digit Indicator	Displays remaining capacity or remaining passcode digits to be inputted.
	Battery Charging	Lights up when charger cable is plugged into charger port.
	Warning Code	System or component issue a warning.
	Error Code	System or component issue an error.

Battery Capacity

	81%-100%
	61%-80%
	41%-60%
	21%-40%
	11%-20%
	<10%
	Indicates that the battery level is almost at 0% and will be turning OFF power shortly.

[Note] Orange color indicates blinking.

USB Type-C Charger Port

The USB Type-C Charger Port is water-resistant.

**Caution**

To avoid electric shock and damage to the e-bike, HMI, or your device, do not plug in any device while the charger port and/or the charging cable plug is wet.

You should still ensure that the charger port on the HMI and charger plug for your rechargeable device are dry and clean before use.

Additional Useful Information

Disposal and recycling Information

In the future, when this product reaches its end of life or when you need to dispose of it for any reason, please take note of the following:



Important Information

- E-Bike electronic components shall be disposed of separately from household waste. Please recycle according to local laws and regulations.

Environmental laws and guidelines vary across the globe. Please always check your local laws and guidelines before recycling.

Troubleshooting

Warning Codes

Component	Code	Description	User Action
Controller (1~16)	W01	Unstable communication between the controller and the battery	<p>If the battery is removable, please turn off the power, reinstall the battery, then turn on the system again.</p> <p>If the warning persists, please contact our service center.</p>
	W02	Abnormalities in motion sensor communication	Please restart the system; if the warning persists, please contact our service center.
	W03	Limited assistance due to overheated controller	<p>The system still functions, but the power assistance output may be limited.</p> <p>You may continue to use the system; but if possible, turn off the assistance and allow the system to cool down for at least 30 minutes. If this warning persists after 2 hours, please contact our service center.</p>
	W04	Limited assistance due to overheated motor	<p>The system still functions, but the power assistance output may be limited.</p> <p>You may continue to use the system; but if possible, turn off the assistance and allow the system to cool down for at least 30 minutes. If this warning persists after 2 hours, please contact our service center.</p>
HMI (9~16)	W09	USB short circuit	Please replace the USB cable, and then restart the system. If the problem persists, please contact our service center.
VCU (17~32)	W17	Unable to turn on the IOT module	If the warning persists, please contact our service center.
	W18	IOT module cannot retrieve SIM card information	If the warning persists, please contact our service center.
	W19	IOT authentication error	If the warning persists, please contact our service center.

	W25	Abnormal USB power supply	Turn off the power and remove cable and rechargeable device. After turning on the power again, please try changing the USB cable and the rechargeable device. Cross check to verify which has failed. If the problem persists, please contact our service center. (The device to be recharged is suggested to be Bluetooth BC 1.2 compliant or above in order to be operate successfully.)
HMI (33~48)	W33	Abnormal reading in light sensor	Please restart the system. If the warning persists, please contact our service center.
	W34	Controller Bike ID authentication failed	Please restart the system. If the warning persists, please contact our service center.
	W35	VCU Bike ID authentication failed	Please restart the system. If the warning persists, please contact our service center.
	W36	Electric lock Bike ID authentication failed	Please restart the system. If the warning persists, please contact our service center.
	W37	Electric shifter Bike ID authentication failed	Please restart the system. If the warning persists, please contact our service center.
	W41	The controller is stuck in bootloader mode	Please update controller's firmware, if the warning persists, please contact our service center.
	W42	The HMI is stuck in bootloader mode	Please update HMI's firmware, if the warning persists, please contact our service center.
	W43	The VCU is stuck in bootloader mode	Please update VCU's firmware, if the warning persists, please contact our service center.
	W44	The electric lock is stuck in bootloader mode	Please update electric lock's firmware, if the warning persists, please contact our service center.
	W45	The electric shifter is stuck in bootloader mode	Please update electric shifter's firmware, if the warning persists, please contact our service center.
E-Lock (49~56)	W49	Abnormal Hall sensor signal in the electric lock	Please first ignore W49 and unlock the bike. After successfully unlocking, please check if the warning has been resolved. If the problem persists, please contact our service center.

Error Codes

Components	Code	Description	User Action
Controller (1~31)	E01	Motor stall is detected	Please restart the system. If the error persists, please contact our service center.
	E02	Speed sensor error	Please restart the system. If the error persists, please contact our service center.
	E03	MCU exception	If the battery is removable, please turn off the power, reinstall the battery, then turn on the system again. If the error persists, please contact our service center.
	E04	Communication fails between controller and battery while turning on power	If the battery is removable, please turn off the power, reinstall the battery, then turn on the system again. If the error persists, please contact our service center.
	E05	Motor is not running smoothly	If it happens while the bike is travelling on more challenging roads, it should be the bike's protective measure; if not, and it happens frequently, please contact our service center.
	E06	Battery reports error	Please restart the system. If the error persists, please contact our service center.
	E07	Torque value error	Please restart the system. If the error persists, please contact our service center.
	E08	Abnormal starting torque value	Please recall if anyone was stepping on the pedals during the process of turning on the power. If so, this is a protective measure of the e-bike to prevent unintended acceleration. The e-bike resumes to normal operation after error code disappears. (Please remember not to step on pedals when turning on the power.) If the error persists, please contact our service center.

E09	Controller is overheating	It is the bike's protective measure due to challenging riding/environmental conditions. Please turn off the system and wait for at least 60 minutes to allow system to cool down. Afterwards, turn on the system; if the error persists, please contact our service center.
E10	Overvoltage in the controller	Please restart the system. If the error persists, please contact our service center.
E11	Undervoltage in the controller	Please restart the system. If the error persists, please contact our service center.
E12	Overcurrent in the controller	Please restart the system. If the error persists, please contact our service center.
E13	Battery fails to discharge	Please restart the system. If the error persists, please contact our service center.
E14	Motor is overheating	It is the bike's protective measure due to challenging riding/environmental conditions. Please turn off the system and wait for at least 60 minutes to allow system to cool down. Afterwards, turn on the system; if the error persists, please contact our service center.
E15	Power button signal error	Please restart the system. If the error persists, please contact our service center.
E16	Motor hall sensor signal error	Please restart the system. If the error persists, please contact our service center.
E17	Driver IC communication error	Please restart the system. If the error persists, please contact our service center.
E18	Driver IC function error	Please restart the system. If the error persists, please contact our service center.
E19	Driver IC signal error	Please restart the system. If the error persists, please contact our service center.

E-Lock (32~39)	E32	Undervoltage in the electric lock	Use the correct charger to charge to full capacity, and check if the error is resolved. If not, please contact our service center.
	E33	Electric lock motor operation timed out	If the error persists, please contact our service center.
E-Shift (40~48)	E40	Overcurrent in the electric shifter	Please restart the system. If the error persists, please contact our service center.
	E41	Electric shifter motor is overheating	Please restart the system. If the error persists, please contact our service center.
	E42	Undervoltage in the electric shifter Driver IC	Please restart the system. If the error persists, please contact our service center.
	E43	Electric shifter operation timed out	Please restart the system. If the error persists, please contact our service center.
	E44	Electric shifter motor stalled	Please restart the system. If the error persists, please contact our service center.
VCU (49~55)	E49	VCU battery not detected	If the error persists, please contact our service center.
	E50	E-bike battery cannot be turned on	Use the correct charger to charge to full capacity, and check if the error is resolved. If not, please contact our service center.
	E51	VCU motion sensor communication error	Please restart the system. If the error persists, please contact our service center.
	E52	Power button signal error	Please restart the system. If the error persists, please contact our service center.
	E53	VCU cannot detect main e-bike battery	Please turn off the system and turn it on again. If the problem still occurs, please contact with service center.
HMI (56~64)	E56	Initial HMI connection failed	Please restart the system. If the error persists, please contact our service center.
	E57	Communication error between controller and HMI	Please restart the system. If the error persists, please contact our service center.
	E58	"Check-value" error between controller and HMI	Please contact our service center.
	E59	Bluetooth initialization failed	If the error persists, please contact our service center.

	E60	HMI button signal error (Analog type)	If the error persists, please contact our service center.
	E61	HMI button signal error (Digital type)	If the error persists, please contact our service center.
	E64	Passcode error	Please enter the passcode again. If you have forgotten it, you can use the app to change the passcode.
Communication (65~80)	E65	Communication error between controller and electric shifter	Please restart the system. If the error persists, please contact our service center.
	E66	Communication error between controller and electric lock	Please restart the system. If the error persists, please contact our service center.
	E67	Communication error between controller and VCU	Please restart the system. If the error persists, please contact our service center.
	E68	Communication error between HMI and battery	Please restart the system. If the error persists, please contact our service center.
	E69	Communication error between HMI and electric shifter	Please restart the system. If the error persists, please contact our service center.
	E70	Communication error between HMI and electric lock	Please restart the system. If the error persists, please contact our service center.
	E71	Communication error between HMI and VCU	Please restart the system. If the error persists, please contact our service center.
	E72	Communication error between VCU and battery	Please restart the system. If the error persists, please contact our service center.
	E73	Communication error between VCU and electric shifter	Please restart the system. If the error persists, please contact our service center.
	E74	Communication error between VCU and electric lock	Please restart the system. If the error persists, please contact our service center.
Battery (81~98)	E81	Undervoltage (UV)	Please restart the system. If the error persists, please contact our service center.
	E82	Open Wire Protection Error for Battery Circuit (Open Wire)	Please restart the system. If the error persists, please contact our service center.
	E83	Battery Cell Unbalance (CU) Protection Error	Please restart the system. If the error persists, please contact our service center.

E84	Battery Over Current Charge (OCC) Protection	Please restart the system. If the error persists, please contact our service center.
E85	AFE Fault Protection Error for Battery	Please restart the system. If the error persists, please contact our service center.
E86	Permanent failure (PF)	Please restart the system. If the error persists, please contact our service center.
E87	Short current (SC)	Please restart the system. If the error persists, please contact our service center.
E88	SW Over discharge current 1 (ODC1)	Please restart the system. If the error persists, please contact our service center.
E89	SW Over discharge current 2 (ODC2)	Please restart the system. If the error persists, please contact our service center.
E90	SW Over charge current 2 (OCC2)	Please restart the system. If the error persists, please contact our service center.
E91	Pre-charge timeout (PCTO)	Please restart the system. If the error persists, please contact our service center.
E92	Over voltage (OV)	Please restart the system. If the error persists, please contact our service center.
E93	Discharge overheat (DOH)	Please restart the system. If the error persists, please contact our service center.
E94	2nd thermistor overheat (FOH)	Please restart the system. If the error persists, please contact our service center.
E95	Charge continue overheat (COH)	Please restart the system. If the error persists, please contact our service center.

Safety Information

FCC compliance statement

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

1. To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
2. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this product not authorized by SMALO by BESV could void the electromagnetic compatibility (EMC) and wireless compliance and negate your authority to operate the product.

This product has demonstrated EMC compliance under conditions that included the use of compliant peripheral devices and shielded cables between system components. It is important that you use compliant peripheral devices and shielded cables between system components to reduce the possibility of causing interference to radios, televisions, and other electronic devices.

Specifications

Item	Spec.
Model	HMI
Operating voltage	5 ± 0.1V
Rating power consumption	a. with right switch:0.35W b. without right switch: 0.25W
Max power consumption	a. with right switch: 0.8W c. without right switch: 0.5W
Weight	a. with right switch: 115g b. without right switch: 86.6g
Display type	LED Display
Output Information	Speed, Charge, SOC, Lock status, Error, Warning, BLE
Assistant Level	Smart Mode
Lighting sensor	Yes
BLE version	4.2 (2402~2480 MHz)
System communication	CAN-BUS (Baud rate 500kb)
USB Port	Type C, powered by VCU
ROHS	Conforms the ROHS of PTC