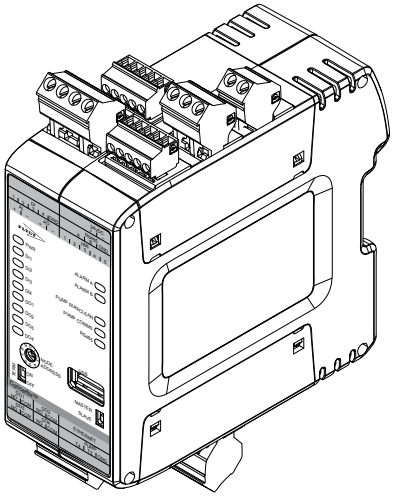
xylem
Let's Solve Water

Installation, Operation, and Maintenance Manual

887966_4.0



FPG 413

CONCERTOR™

FLYGT
a xylem brand

Table of Contents

1 Introduction and Safety

1.1 Introduction

Purpose of the manual

The purpose of this manual is to provide necessary information for installation, operation, and maintenance of the unit.

Read and keep the manual

Save this manual for future reference, and keep it readily available at the location of the unit.

CAUTION:

Read this manual carefully before installing and using the product. Improper use of the product can cause personal injury and damage to property, and may void the warranty.

The equipment, and its functioning, may be impaired if used in a manner not specified by the manufacturer.

Intended use

WARNING:

Operating, installing, or maintaining the unit in any way that is not covered in this manual could cause death, serious personal injury, or damage to the equipment and the surroundings. This includes any modification to the equipment or use of parts not provided by Xylem. If there is a question regarding the intended use of the equipment, please contact a Xylem representative before proceeding.

1.2 Safety terminology and symbols

About safety messages

It is extremely important that you read, understand, and follow the safety messages and regulations carefully before handling the product. They are published to help prevent these hazards:

- Personal accidents and health problems
- Damage to the product and its surroundings
- Product malfunction

Hazard levels

Hazard level	Indication
 DANGER:	A hazardous situation which, if not avoided, will result in death or serious injury
 WARNING:	A hazardous situation which, if not avoided, could result in death or serious injury
 CAUTION:	A hazardous situation which, if not avoided, could result in minor or moderate injury
NOTICE:	Notices are used when there is a risk of equipment damage or decreased performance, but not personal injury.

Special symbols

Some hazard categories have specific symbols, as shown in the following table.

Electrical hazard	Magnetic fields hazard
 Electrical Hazard:	 CAUTION:

1.3 User safety

Introduction

All government regulations, local health and safety directives must be observed.

Prevent danger due to electricity

All danger due to electricity must be avoided. Electrical connections must always be carried out in compliance with the following:

- The standard connections shown in the product documentation that is delivered together with the product
- All international, national, state, and local regulations. (For details, consult the regulations of your local electricity supplier.)

For more information about requirements, see sections dealing specifically with electrical connections.

1.3.1 Power lock-out

DANGER: Electrical Hazard

Before starting work on the unit, make sure that the unit and the control panel are isolated from the power supply and cannot be energized. This applies to the control circuit as well.

1.3.2 Qualification of personnel

WARNING: Electrical Hazard

Risk of electrical shock or burn. A certified electrician must supervise all electrical work. Comply with all local codes and regulations.

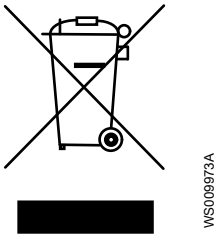
All work on the product must be carried out by certified electricians or Xylem authorized mechanics.

Xylem disclaims all responsibility for work done by untrained, unauthorized personnel.

1.4 End of life product disposal

Handle and dispose of all waste in compliance with local laws and regulations.

EU only: Correct disposal of this product – WEEE Directive on waste electrical and electronic equipment

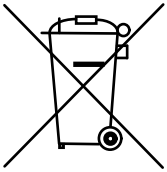


This marking on the product, accessories or literature indicates that the product should not be disposed of with other waste at the end of its working life.

To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Waste from electrical and electronic equipment can be returned to the producer or distributor.

EU only: Correct disposal of batteries in this product



This marking on the battery, manual or packaging indicates that the batteries in this product should not be disposed of with other waste at the end of its working life. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in EC Directive 2006/66. If batteries are not properly disposed of, these substances can cause harm to human health or the environment.

To protect natural resources and to promote material re-use, please separate batteries from other types of waste and recycle them through your local, free battery return system.

1.5 Spare parts

CAUTION:

Only use the manufacturer's original spare parts to replace any worn or faulty components. The use of unsuitable spare parts may cause malfunctions, damage, and injuries as well as void the warranty.

1.6 Warranty

For information about warranty, see the sales contract.

1.7 Support

Xylem only supports products that have been tested and approved. Xylem does not support unapproved equipment.

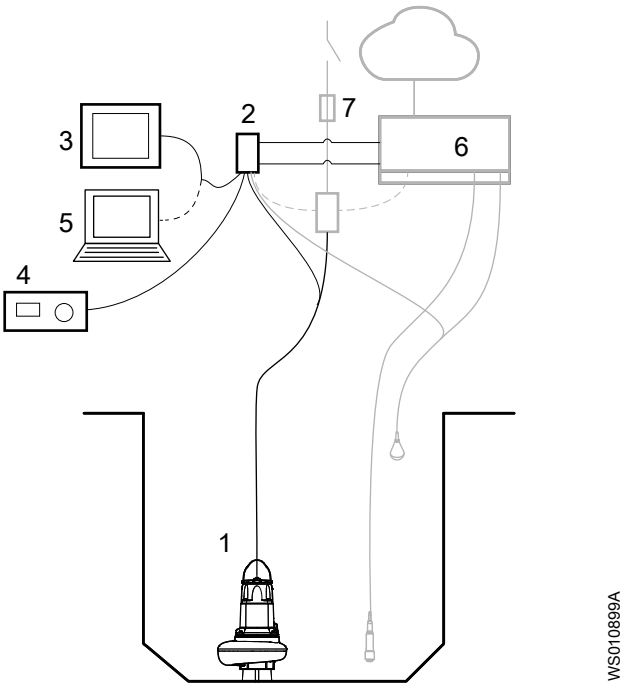
2 System Description

2.1 System overview

Concertor™ is a wastewater pumping system with integrated intelligent technology.

2.2 Concertor™ EA

Parts



No.	Part	Product name	Description
1	Pump	6020	A Concertor™ pump.
2	Gateway	FPG 413	• A gateway with an embedded web server. – Digital input signal – Modbus – High level switch • All the alarms are sent back to the external control system. • The operator changes the pump settings through the gateway. • Data is logged by and stored in the gateway.

No.	Part	Product name	Description
3	HMI	FOP 402	HMI - Alternative 1 • A touchscreen HMI that is used for navigation and selection in the menus. • The touchscreen HMI is connected to a web server that is embedded in the gateway.
4	HMI	FOP 315	HMI - Alternative 2 • A basic HMI with a jog wheel that is used for navigation and selection in the menus.
5	Computer	–	HMI - Alternative 3 • The computer gives access to the same menu system as the touchscreen HMI. • The computer is connected to a web server that is embedded in the gateway.
6	Connectivity options	–	• Controller / RTU / PLC • Level sensors • Cloud services
7	Connection to power	–	Contactors, fuses, relays

3 Product Description

3.1 Product design

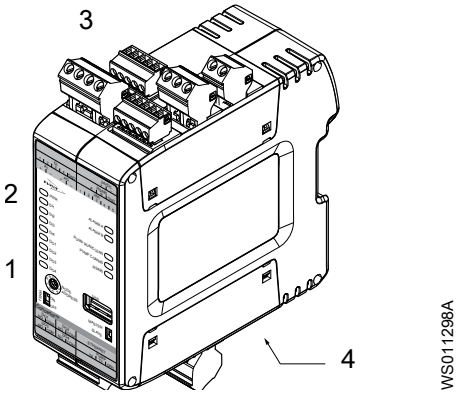
FPG 413 is a gateway that is part of the Concertor™ system. The gateway is connected to Flygt pumps 6020.180/090 or 6020.181/091. The gateway starts and stops the pump based on the input signal from the external control system. All the alarms are sent back to the external control system. Data is logged by and stored in the gateway.

Product name	Part number	Description
FPG 413	8156500	Gateway for Concertor™ EA. The pump performance is easily adjustable when the pump is stopped.

3.2 Approvals

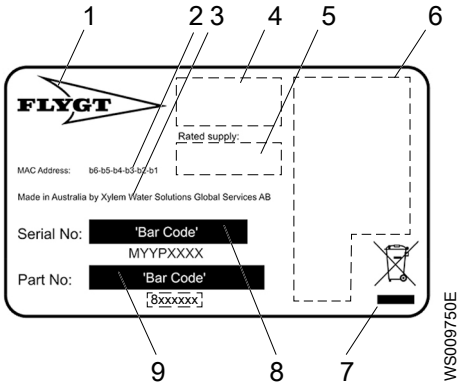
- CE
- UL
- CSA
- RCM

3.3 Parts



1. Front connections
2. Status LEDs
3. Top connections
4. Bottom connections

3.4 The data plate



1. Brand
2. MAC address
3. Country of origin. Manufacturer.
4. Product
5. Rated supply
6. Approvals
7. Waste disposal symbol
8. Serial number
9. Part number

4 Mechanical Installation

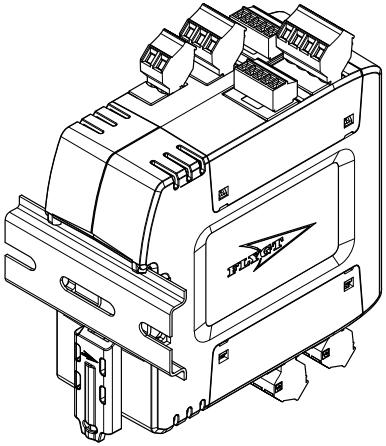
4.1 Do not install in an explosive zone

NOTICE:

Do not use this unit in environments that may contain flammable/explosive or chemically aggressive gases or powders.

4.2 Install the gateway

Snap the unit onto the DIN rail.



WS009751B

5 Electrical Installation

5.1 Precautions

Before starting work, make sure that the safety instructions in the chapter *Introduction and Safety* on page 3 have been read and understood.

DANGER: Electrical Hazard

Before starting work on the unit, make sure that the unit and the control panel are isolated from the power supply and cannot be energized. This applies to the control circuit as well.

DANGER: Electrical Hazard

All electrical equipment must be grounded (earthed). Test the ground (earth) lead to verify that it is connected correctly and that the path to ground is continuous.

WARNING: Electrical Hazard

Risk of electrical shock or burn. A certified electrician must supervise all electrical work. Comply with all local codes and regulations.

WARNING: Electrical Hazard

There is a risk of electrical shock or explosion if the electrical connections are not correctly carried out, or if there is fault or damage on the product. Visually inspect equipment for damaged cables, cracked casings or other signs of damage. Make sure that electrical connections have been correctly made.

CAUTION: Electrical Hazard

Prevent cables from becoming sharply bent or damaged.

Requirements

These requirements apply for electrical installation:

- All fuses and circuit breakers must have the proper rating, and comply with local regulations.
- The cables must be in accordance with the local rules and regulations.

5.2 Cables

These requirements apply for cable installation:

- The cables must be in good condition, not have any sharp bends, and not be pinched.
- The sheathing must not be damaged and must not have indentations or be embossed at the cable entry.
- The minimum bending radius must not be below the accepted value.
- The cables must have the appropriate temperature rating.

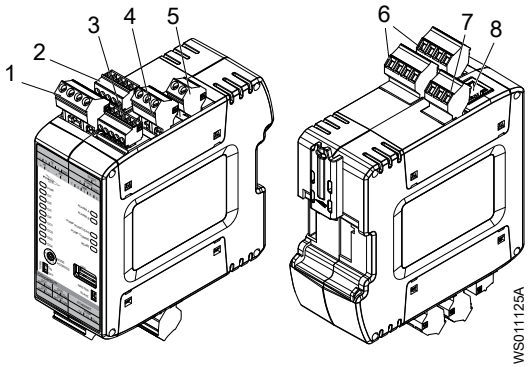
5.3 Concertor™ EA

In a Concertor™ EA system, the gateway is installed with an external control system. For more information, see *System Description* on page 7.

Some of the connection terminals are configurable. For more information, see the System Installation and Operation Manual.

5.3.1 Connect a single unit

This instruction describes all connection possibilities. Some of them are optional. Connect only one HMI.



1. Analog input and output
2. Digital inputs
3. HMI, FOP 315
4. RS-485, Modbus RTU
5. + 24 VDC
6. Digital outputs
7. T3, T4
8. Ethernet

Pump

1. Connect the T3 and T4 cables from the pump to the T3, T4 terminal.

Create as much separation as possible between the power cores and the control cables. Keep the T3 and T4 cables twisted and shielded as close to the terminals as possible.

Ethernet

2. Connect the Ethernet cable to the Ethernet terminal.

   It is possible to use the Ethernet terminal for multiple communication options:

   - Communication with FOP 402
   - Communication with SCADA systems through Modbus TCP

   If the Ethernet terminal is used for multiple communication options, then use an Ethernet switch.

   - The Ethernet cable must fulfill category 5.
   - For more information about the Modbus interface, see separate documentation.

FOP 315 HMI

3. Connect the FOP 315 cable to the HMI terminal.

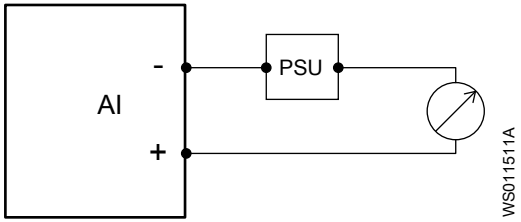
   The maximum cable length is 100 meters.

Description	HMI cable	Cable color	HMI terminal on the gateway
Ground	GND	Black	1
CAN low	L	Blue	2
Shield	–	Transparent	3
CAN high	H	White	4
Power	+24 V	Red	5

Modbus RTU

4. Connect the Modbus RTU cable to the RS-485 terminal.
5. Connect the analog input cables to the analog input terminal.

   The analog input is passive. The external circuit needs an external power source.

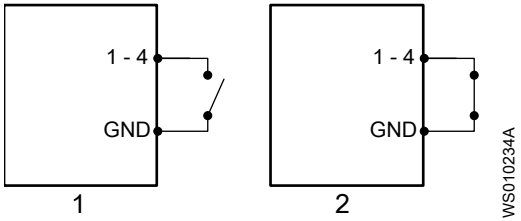


Signal	Description
4 mA	Minimum input
20 mA	Maximum input

Digital inputs

6. Connect the digital input cables to the digital input terminal.

The digital inputs are configurable to be normally open or normally closed.

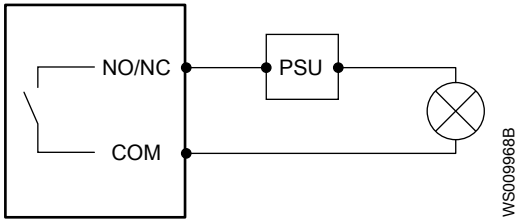


1. Open
2. Closed

Digital outputs

7. Connect the digital output cables to the digital output terminals.

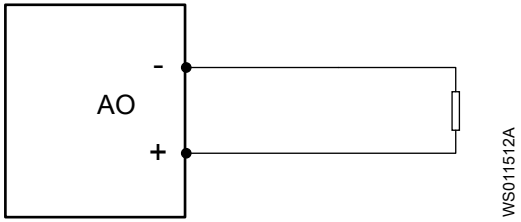
   The digital outputs are potential free relay outputs. Connect a power supply unit maximum 250 VAC, or 30 VDC, 5 A.



Analog output

8. Connect the analog output cables to the analog output terminal.

   The analog output is active. The external circuit does not need an external power source.



Signal	Description
4 mA	Minimum level
20 mA	Maximum level

Power

9. Connect the power cables to the + 24 VDC terminal.

   The power supply unit must fulfill isolation class II.

5.3.2 Connect multiple units

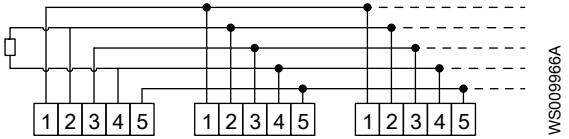
When multiple units are installed in the same application, cables are connected in parallel or separately.

The backplane connectors are not used when the installation includes gateways only.

Connect only one HMI.

1. Connect the FOP 315 HMI cables in parallel.

   Terminate the cable on both ends of the chain with 120 ohm resistors between terminals 2 and 4. The maximum cable length is 100 meters.



2. Connect the start signal cables separately.
3. Connect the Modbus cable in parallel.
4. Connect the Ethernet cable through a switch to each gateway.
5. Connect the power cable separately or in parallel.

5.3.3 Set the switches

Set the switches.

Switch	Correct setting
NODE ADDRESS, 0–9	All the node addresses in the system must be unique and not 0.
MASTER/SLAVE	MASTER
TERM, ON/OFF	ON

6 Operation

6.1 Startup and operation

For instructions about the system operation, see the System Installation and Operation manual.

6.2 LED indicators

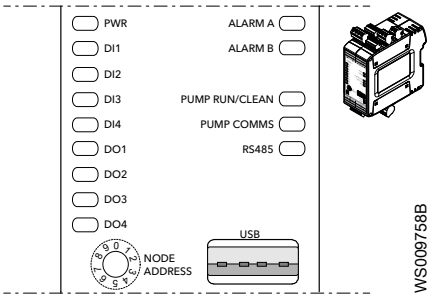


Table 1: Normal operation

LED	Description	Color	Indication
PWR	Power	Green	The power is on. 21.6-26.4 V
		–	The power is off.
		Orange	20.0-21.6 V 26.4-29.4 V
		Red	<20.0 V >29.4 V
DI1 – DI4	Digital inputs	Green	The digital input receives a signal.
		–	The digital input does not receive a signal.
DO1 – DO4	Digital outputs	Green	The digital output is active.
		–	The digital output is inactive.

LED	Description	Color	Indication
ALARM A	Alarm, Class A	Flashing red	The alarm is not acknowledged. The alarm condition is either present or has ceased.
		Constant red	The alarm condition is present. The alarm is acknowledged, or no acknowledgement is required.
		–	There is no alarm.
ALARM B	Alarm, Class B	Flashing red	The alarm is not acknowledged. The alarm condition is either present or has ceased.
		Constant red	The alarm condition is present. The alarm is acknowledged, or no acknowledgement is required.
		–	There is no alarm.
PUMP RUN/CLEAN	Pump running	Green	The pump is operating.
	Pump cleaning	Orange	The cleaning process is running.
PUMP COMMS	Pump communication	Green	The pump communication is established.
		–	No pump communication is established.
RS-485	Modbus RTU communication	Green	Modbus RTU communication
		–	No Modbus RTU communication

Table 2: Fault indications

ALARM A	ALARM B	PUMP RUN/ CLEAN	PUMP COMMS	RS-485	Indication
Flashing red				Flashing green	The unit is defective. Contact the local sales and service representative.
Flashing red	Flashing red	Flashing orange	Flashing green	Flashing green	Software fault. Restart the unit.

7 Maintenance

7.1 Preventive maintenance

Make sure that the unit is free from dust. Use a dry, soft cloth.

8 Troubleshooting

8.1 The unit does not work

Make sure that all wires are correctly connected according to the cable chart.

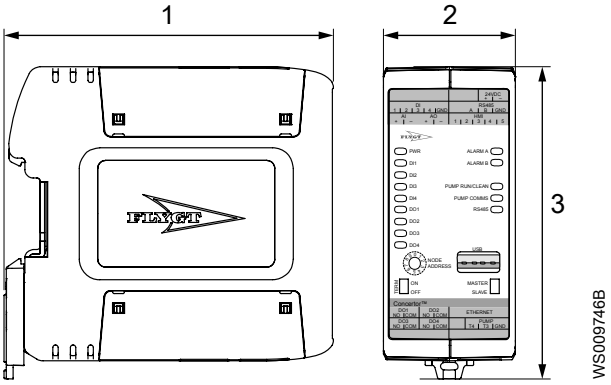
Cause	Remedy
The **PWR** LED is not lit.	• Make sure that the unit receives voltage. • Restart the unit.
The unit does not communicate with the pump.	• Make sure that the pump receives voltage. • Restart the pump and the unit.

If the problem persists, then contact a sales or authorized service representative.

Always state the product number and the serial number of the product.

9 Technical Reference

9.1 Dimensions



1. 112 mm (4.4 in)
2. 45 mm (1.8 in)
3. 106 mm (4.2 in)

9.2 Environmental requirements

Parameter	Value
Operating temperature	-20°C – +65°C (-4°F – 149°F)
Storage temperature	-20°C – +70°C (-4°F – 158°F)
Operating humidity	Relative humidity, non-condensing: 5 – 95%
Sunlight exposure	UV-resistant
Maximum altitude	• With UL approval: Maximum 2000 m (6562 ft) • Without UL approval: 4000 m (13 123 ft)
Pollution degree	2
Installation location	Indoors

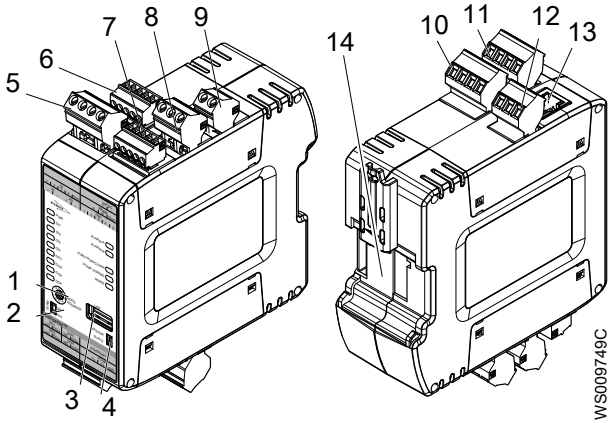
9.3 IP-rating

IP20

9.4 Electrical data

Parameter	Value
Supply voltage	+ 24 VDC
Supply voltage tolerance	21.5–28.5 VDC
Current consumption	< 700 mA. Typical: 150 mA

9.5 Terminals



Section	Terminal		Description
1	NODE ADDRESS		Node address 0–9, rotary switch. 0 is not used.
2	TERM		Backplane termination switch
3	USB		Standard type A USB socket
4	MASTER, SLAVE		MASTER/SLAVE switch
5	AI	+	Isolated analog input, 4–20 mA Maximum 24 VDC Scaling: 0–100% Offset: 0–16 mA with 0.1 mA resolution
		–	
	AO	+	Analog output, 4–20 mA Maximum 24 VDC
		–	
6	DI	1	Digital inputs Maximum 24 VDC
		2	
		3	
		4	
		GND	Common ground (earth)
7	HMI • Flygt FOP 315	1	Ground
		2	CAN low
		3	Shield
		4	CAN high
		5	+ 24 VDC output
8	RS-485	A	Modbus RTU
		B	
		GND	

Section	Terminal		Description
9	24 VDC	+	24 VDC Tolerance: 21.5–28.5 VDC The power supply unit must fulfill isolation class II. < 700 mA. Typical: 150 mA Fuse: 1 A
		–	
10	DO3	NO	Digital outputs Potential free relay output Maximum 250 VAC, or 30 VDC, 5 A External fuse required, 5 A
		COM	
	DO4	NO	
		COM	
11	DO1	NO	
		COM	
	DO2	NO	
		COM	
12	PUMP	T4	Pump communication
		T3	
		GND	Not used
13	Ethernet		• Modbus TCP • Web server
14	Backplane		The Flygt controller communicates with the Flygt gateways through the backplane.

Xylem |'zīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to www.xylem.com

xylem
Let's Solve Water

Xylem Water Solutions Global Services AB
361 80 Emmaboda
Sweden
Tel: +46-471-24 70 00
Fax: +46-471-24 74 01
http://tpi.xyleminc.com

Visit our Web site for the latest version of this document and more information

The original instruction is in English. All non-English instructions are translations of the original instruction.

887966_4.0_en-US_2019-03_IOM_FPG 413