



# FS Router

Installation and service



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# FS Router

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# About this manual

## Aim and scope

This manual concerns the FS Router, a wireless repeater for the Priva FS Performance labour registration system for the horticulture industry.

This manual contains all of the information required to safely and correctly transport, install, commission and maintain the FS Router. This manual will also allow you to effectively observe and resolve any malfunctions.

For the sake of simplicity this manual uses the term "unit", to refer to "FS Router".

## Target groups and required competencies

Target group	Tasks and responsibilities	Training, knowledge and experience required
Installers/ service engineers	<ul style="list-style-type: none"><li>• Transportation</li><li>• Positioning</li><li>• Installation</li><li>• Commissioning and set up</li><li>• Testing after initial commissioning and problem solving</li><li>• Operation</li><li>• Annual checks</li><li>• Disposal of the unit at the end of the service life</li></ul>	<ul style="list-style-type: none"><li>• technical training in the field of electrical engineering</li><li>• experience with electrical installations for the horticulture industry</li><li>• Priva product specific training</li><li>• command of (technical) English</li></ul>

## Availability of the manual

This manual is exclusively intended for installers and service engineers.

## Related documents

FS Reader Software – User Manual

FS Concentrator – Installation and Service Manual

## Symbols in this manual

	Live parts (danger of electrocution)
	Danger. Instruction to prevent physical injury, damage to health, or damage to the environment
	Note. Instruction to prevent problems or material damage
	Additional information or explanation
	Tip

## Terms and abbreviations



The list below states the abbreviations and terms relating to the Priva labour and production registration units of FS Performance. Therefore, abbreviations and terms that do not apply to your specific unit and as a result are not used in this manual may still be found in the list below.

Abbreviation / term	Explanation
FS Reader	Handheld device for registration of labour
FS Cradle	Storage/charger for the handheld device for registration of labour
FS Tag	Electronic label for the labour registration system
FS Concentrator	Wireless access point for the labour registration system
FS Router	Wireless repeater for the labour registration system
FS Reader Software	Supporting software for handheld devices for registration of labour

# Safety



Before starting to work with the product, read the entire manual so that you are familiar with all safety instructions and safety precautions.

In addition, read any other manuals supplied with specific components.

## Safety - general

- Only Priva approved installers/service engineers who have received product-specific training from Priva are allowed to install, configure, repair and, if necessary, alter the equipment
- Making alterations to the safeguards and safety icons on the equipment is prohibited.
- Both the installer/service engineer and the user must check and maintain the equipment (the safeguards in particular) in accordance with the instructions in this manual. Keep the product clean and the surroundings tidy.
- Report faults or damage to Priva immediately. Inactivate the equipment and do not use it if a deficiency is observed.
- Only use original spare parts for repairs (refer to the price list).
- After repairing the unit, check the correct status and functioning of it.
- If the user allows personnel to operate the equipment, he must provide sufficient instructions. In particular, this should be on the safety risks and safety instructions as stated in this manual. He must also supervise correct compliance with the instructions.
- Ensure that the personal protective equipment prescribed in this manual is available and that it is used.
- Display the safety icons that are applicable in the room where the equipment is set up.

## Electrical safety



The unit is powered from the mains voltage. There is a potential hazard of electrocution or fire resulting from a short circuit. Therefore, comply with the following safety instructions:

- Keep the housing of electrical components (cabinet, pump etc.) closed.
- Keep the electrical parts dry.
- Ensure that the grounding is correctly connected.
- Ensure that the unit is connected to its own fuse group with the correct fuses/circuit breakers.

During installation or maintenance, or while resolving malfunctions it may be necessary to open the housing of the electrical components. In this case, comply with the following safety instructions:

- Make sure there is no voltage on the unit by removing the plug from the socket outlet, or by removing fuses / disconnecting circuit breakers.
- If the unit cannot be made free of electricity, then take extreme care. Use well-insulated tools and do not touch wire ends, connections and electrical components with bare hands. Keep the surroundings dry and ensure that there is someone close by to keep an eye on you.
- Wear a grounded wristband while working in the cabinet. Static electricity can damage the electronic components.

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## Residual risks

The following risks could not be excluded in the design:

- If the unit is altered or is used in such a way that it becomes contrary to the instructions in this manual, unforeseen risks may occur.

## Product description

The FS Router is part of the labour and production registration system of Priva FS Performance.

It is designed as a repeater unit in the wireless network over which the data is transmitted.

## Functions and intended use

### Functions

The FS Router is the part of the wireless system responsible for the majority of the wireless coverage. The system of FS Routers collect the registration data transmitted by the FS Readers and pass it along, to either the concentrator or other FS Routers.

### Intended use

The FS Routers are intended to be positioned throughout the facility, wherever wireless coverage for the FS Readers is necessary. After the FS Routers have been installed and they are operational, no further actions are necessary to keep them working unless there is an error within an individual FS Router.

# Transport and storage

## Dimensions

Dimensions (including packaging): 225 x 134 x 84 mm.

Weight (including packaging): 560 g.

## Contents of the package

The package of the FS Router contains the following items:

- 1 FS Router.
- A horizontal cable entry plug (already placed on the PCB inside the FS Router casing).
- A mounting set containing 4 clips and 4 screws for mounting the FS Router to (for instance) a cable tray.



Horizontal cable entry plug



Mounting set

No power cord is delivered with the FS Router.

## Conditions during transport and storage

The ambient conditions must remain within the following limits during transport and storage:

- Temperature: 0 ... 50 °C
- Relative air humidity: maximum 95 % (non-condensing)
- Rain: the packaged equipment must be kept dry and must therefore, not stand outdoors.
- Sunlight: the packaged equipment must not stand in bright sunlight. Otherwise, the internal temperature may become too high causing deformation in the plastic components.
- Vibrations: avoid exposure to strong vibrations.

# Installation - positioning the unit

## Location and environmental conditions

The FS Router has been tested extensively under greenhouse conditions, therefore the equipment does not have to be placed in an environment with specific conditions.

## Basic facility requirement

In order for the FS Router to be installed and made operational, only a power cable, to be connected to a power socket, is required.

The FS Router is delivered with some basic fasteners (screws and clips), that can be used to mount the FS Router.

## Positioning the unit

All FS Routers must be positioned in the same orientation as the FS Concentrator, i.e. the same side must be up, to achieve the best communication throughput.

The connector side of the FS Router should be at the bottom:

- Because of reasons of water tightness.
- To allow that the led indicator will be visible.

Because the antenna for the wireless communication is placed at the side of the connector, this side must be free of metal masking.

In total a maximum of 254 FS Concentrators + FS Routers (together) can be supported within one wireless network.

An additional constraint is applicable for the number of FS Routers that together form the chain between the FS Reader and the FS Concentrator: it should be taken into account that at most 38 FS Routers can be supported in between the FS Reader and FS Concentrator.

The locations where the FS Routers should be positioned depends on the amount of wireless coverage that is desired in the facility. The most common application is to have wireless coverage in the main corridor in the greenhouse, which means the FS Routers should be placed on regular intervals along this central corridor.

# Installation - electrical part



Because the FS Router is a permanently connected equipment, a readily accessible disconnect device must be incorporated external to this equipment.



An overcurrent protective device for max 20 A must be provided external to this equipment.



The electrical power shall be connected through cables according to local regulations.

## Electrical connection

The FS Router can be connected to any standard power socket. This is done by connecting any standard power cable according to local regulations.

1. The installer selects the location for the FS Router, based on the strength of the wireless network and availability of power sockets.
2. The installer opens the casing of the FS Router with a screwdriver.
3. Make sure that the power switch (in the yellow square in the picture below) is in the "OFF" position.



Figure 1

4. The installer connects a power cord. This is done by splitting the cord and connecting two wires to the provided cable entry plug. The location on the PCB on which the plug should be connected is shown in the blue square in Figure 1.  
L = Line wire;  
N = Neutral wire.
5. Mount the FS Router to the selected location, for instance by using the supplied clips and screws.
  - a. Fasten the clips to the casing by screwing the screws through the holes in the corners of the casing into the clips.
  - b. Then fasten the FS Router by means of these clips to the intended location, for instance with screws or bolts and nuts (not provided in the FS Router package).
  - c. Please obey any applicable local regulations.



6. The installer switches the switch indicated in the yellow square in Figure 1 to "ON".
7. Close the casing and connect the electrical power.
8. The installer makes sure that the led on the FS Router is switched on, thereby confirming that the FS Router has power supply.

# Installation - partie électrique



Le FS Router est un équipement connecté en permanence, un dispositif de déconnexion facilement accessible doit être incorporé externe de cet équipement.



Un dispositif de protection contre les surintensités pour max 20 A doit être fourni externe de cet équipement.



La puissance électrique doit être relié par des câbles conformément aux réglementations locales.

## Raccordement électrique

Le FS Router peut être raccordé à n'importe quelle prise de courant standard. Cela se fait en connectant un câble d'alimentation standard conformément aux réglementations locales aux FS Router.

1. L'installateur sélectionne l'emplacement pour le FS Router, sur la base de la portée au réseau sans fil et la disponibilité des prises de courant.
2. L'installateur ouvre l'enveloppe pour le FS Router avec un tournevis.
3. Assurez-vous que l'interrupteur d'alimentation (dans le carré jaune) est dans la position «OFF».



Figure 2

4. L'installateur se connecte un cordon d'alimentation. Cela se fait en divisant le cordon de raccordement et deux fils à la prise prévue d'entrée de câble. L'emplacement sur la carte sur la fiche, qui épaulement être connecté est affiché dans le carré bleu sur la figure 2.  
L = Fil de ligne;  
N = Fil neutre.
5. Fixer le FS Router à l'emplacement sélectionné, par exemple en utilisant les clips et les vis fournies.
  - a. Fixer les attaches au boîtier en vissant les vis dans les trous dans les coins de l'enveloppe dans les clips.
  - b. Fixez ensuite le FS Router à l'aide des clips à l'emplacement prévu, par exemple avec des vis ou des boulons et des écrous (non fournis dans le package FS Router).
  - c. Se il vous plaît respecter toutes les réglementations locales applicables.



6. L'installateur met l'interrupteur indiqué dans le carré jaune dans la figure 2 sur "ON".
7. Fermez le boîtier et connecter l'alimentation électrique.
8. L'installateur permet de s'assurer que le conduit sur le routeur FS est de fonctionner, ce qui confirme que le FS Router a le pouvoir.

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## Operating software

The functionality of the FS Router is based in its firmware.

The FS Router is delivered with the most recent version of this firmware that was available at the moment of production.

The FS Router can be updated with the latest firmware. Please, refer to the "FS Reader Software – User Manual" for more information.

# Commissioning



Only Priva approved service engineers/installers who have received product-specific training from Priva are allowed to commission the unit.

## Preparations

After the steps in section “Installation - electrical part” on page 11 have been performed, the FS Router is ready for the final commissioning steps.

## Commissioning

The remainder of the installation steps are described in the “FS Reader Software – User Manual”:

- Register the FS Router by providing the serial number.

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# Operation

The FS Router works automatically once installed and therefore no further action is needed. .

The FS Router has a tri-colour status led: Red + Green + Orange, which has the following signalling function:

<u>Led shows:</u>	<u>Indicates:</u>
• Off	FS Router is switched OFF
• Red	FS Router is switched ON and contains an error
• Orange	FS Router is switched ON and had no data activity during the last 30 minutes
• Green continuous	FS Router is switched ON and did have data activity during the last 30 minutes
• Green blinking	FS Router is switched ON and has currently data activity.

## Taking out of operation

In order for the FS Router to be taken out of operation, the following steps need to be undertaken:

1. The steps required to remove the FS Router from the labour registration system are described in the "FS Reader Software – User Manual".
2. The installer disconnects the power cord.
3. The unit is now ready to be shipped for repair or decommissioning.

# Troubleshooting



This chapter provides solutions for the most frequent problems with the equipment. If you have a problem that cannot be resolved using the information in this chapter, please contact Priva.

## Troubleshooting – general



Certain activities may only be performed by authorised installers/service engineers because they require specialist knowledge and skills. Those activities are indicated by "Installer" in the table below.

Problem	Possible cause	Solution(s)
Led off	Power cord disconnected	Reconnect power cord
Led off	Fuse is broken	Replace the fuse
Led red		
Led orange		

## Maintenance and repair

The FS Router does not require regular maintenance in order to keep it working.

If the FS Router is in need of repair, the customer will contact Priva B.V. after which the product can be sent back to Priva B.V. for repair or possible replacement.



Warranty void if seal is broken.

## Firmware updates

If the FS Router requires a new firmware version, this should be made available in the "FS Reader Software". When this has been completed, all FS Routers in the network will upload and activate the new firmware automatically. The network regulates itself that only one device will be updated at a time.

When the FS Router is updated with its new firmware, it will be temporarily inactive. This takes less than a minute and the remaining part of the wireless network keeps working.

## Disposal of waste equipment

The unit must be disposed of at the end of its service life.

The product can be disposed of according to regulations concerning electrical devices in the designated country.



The equipment is marked in accordance with European directive 2002/96/EC relating to waste electrical and electronic equipment (WEEE):



The mark indicates that the equipment cannot be disposed of with other household waste at the end of its service life. To prevent possible harm to the environment or to human health from uncontrolled waste disposal the equipment must be kept separate from other types of waste and be recycled in a responsible manner, so that the sustainable reuse of material sources is stimulated.

# Appendices

## Technical specifications

- Dimensions:
  - Length: 210 mm (incl. swivel)
  - Width: 129 mm
  - Depth: 60 mm
  - Weight: 462 gram
- Electrical characteristics:
  - Input voltage: 100 .. 240 Vac
  - Mains frequency: 50 .. 60 Hz
  - Power consumption: 5 W (max)
- Supported frequencies for the wireless communication:
  - Europe and Africa: 869.5 MHz and 868.3 MHz
  - America: 915.0 MHz and 916.0 MHz
  - Asia and Oceania: 920.0 MHz and 921.0 MHz
- Wireless communication sending power:
  - EIRP: 6.49 mW (max)
- Transport / storage conditions:
  - Temperature: -40 .. 70 °C
  - Relative humidity: 10 .. 95 %
  - Ambient pressure: 70 .. 105 kPa
- Operating conditions:
  - Temperature (ambient) 0 .. 50 °C
  - Temperature change max 30 °C / day
  - Relative humidity 20 .. 95 %
- Approvals / certifications that are pending:
  - UL
  - CSA
  - CE
  - C-Tick

# EC Declaration of Conformity

The manufacturer:

Name manufacturer Priva B.V.  
Manufacturer's address Zijlweg 3  
2678 LC De Lier  
Postbus 18  
2678 ZG De Lier  
Nederland

declares that the product:

Product name FS Router  
Function Wireless repeater for the labour registration system

is in conformity with the essential requirements of the following European Directives:

- Low Voltage Directive 2014/35/EU
- R&TTE Directive 1999/5/EC
- Electromagnetic Compatibility Directive 2004/108/EC

and conforms to the following harmonized European Standards:

EN 60950-1:2006	Information technology equipment - Safety
EN 300 220-1 V2.4.1	ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods
EN 300 220-2 V2.4.1	ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 301 489-01 V1.9.2	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
EN 301 489-03 V1.4.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz
EN 62311:2008	Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz-300 GHz)

The technical file was compiled by the department Product Development of Priva B.V.

The Netherlands, De Lier, December 2015



M. Prins  
Managing Director

## FCC Statement

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 of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into 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.

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

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.

## IC Statement

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:

- 1) this device may not cause interference and
- 2) this device must accept any interference, including interference that may cause undesired operation of the device

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

- 1) l'appareil ne doit pas produire de brouillage, et
- 2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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