

# Install Guide

FarmDefender™ FD-120 — Sprayflex 120' mid-mount

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|-------------------|---------------------------------------------------------------------|
| <b>Version</b>    | v1.5                                                                |
| <b>Revised</b>    | 2026-08-14                                                          |
| <b>Applies to</b> | All FD-120 systems shipped for the Sprayflex 120' mid-mount sprayer |



# FarmDefender™ FD-120 — Install Guide

**Machine:** Sprayflex 120' mid-mount **Document version:** 1.5 (2026-08-14) **System serial:** <SERIAL> (e.g. FD-120-26-0003)

The kit ships fully built. Your install is mechanical mounting and plugging in labeled, gender-keyed cables. Four reference pages are attached at the back, in install order: 1. Camera Mounting Guide — which nozzles each camera bracket sits over 2. Power Routing — where the battery box, Central Hub, and Starlink mount on the Sprayflex chassis 3. Cable Kit — every cable in the kit, how many, and the route for each 4. Boom Topology — connection diagram showing each cable in place between Central Hub, switches, and cameras

## Kit contents

Every component that ships with one system:

| Qty   | Item                                                                          | SKU             |
|-------|-------------------------------------------------------------------------------|-----------------|
| 1     | Central Hub V2 (external nozzle-control)                                      | FD-CH-V2        |
| 11    | Weed Detector (10 boom + 1 cab-front)                                         | FD-WD           |
| 4     | Camera Hub switch (2 per wing — inboard + outboard)                           | FD-SW           |
| 2     | 12V->48V converter — Daygreen H10-1224-48                                     | FD-PWR-CONV-01  |
| 1     | 48V->USB-C PD adapter (Starlink)                                              | FD-PWR-STRLK-PD |
| 1     | Master cutoff contactor — Altran ALEV50-B                                     | FD-PWR-CTR-01   |
| 4     | Fuses — 1x 60A MEGA, 2x 30A ATC, 1x 5A coil                                   | —               |
| 4     | 48V Y-split                                                                   | —               |
| 1     | Cab cutoff switch (SPST rocker)                                               | —               |
| 2     | Power cable, 10.5 m                                                           | FD-PWR-10.5M    |
| 2     | Power cable, 12.0 m                                                           | FD-PWR-12.0M    |
| 3     | Power cable, 8.0 m                                                            | FD-PWR-8.0M     |
| 1     | Power cable, 1.0 m                                                            | FD-PWR-1.0M     |
| 3     | Ethernet cable, 12.0 m                                                        | FD-ETH-12.0M    |
| 2     | Ethernet cable, 7.0 m                                                         | FD-ETH-7.0M     |
| 2     | Ethernet cable, 5.0 m                                                         | FD-ETH-5.0M     |
| 8     | Ethernet cable, 2.0 m                                                         | FD-ETH-2.0M     |
| 2     | CAN cable, 1.0 m                                                              | FD-CAN-1.0M     |
| 1     | Service-port cable (DTM-8 -> RJ45, 1 m)                                       | FD-ETH-1.0M     |
| 1 set | Boom tube + brackets + bolts (1" square steel; front-detector mount included) | FD-MOUNT-120    |
| 1     | GPS antenna + SMA cable                                                       | FD-ANT-GPS      |
| 1     | Starlink Mini                                                                 | FD-STRLK-01     |

| Qty | Item                                                                           | SKU |
|-----|--------------------------------------------------------------------------------|-----|
| —   | Consumables — split loom, ties, dielectric grease, labels, spare DTM terminals | —   |

**25 cables total** (8 power + 15 ethernet + 2 CAN), plus the 1 m service-port cable. All pre-cut and heat-shrink-labeled at both ends. If anything is missing or damaged, **stop and call (406) 271-6400** before starting the install.

## Mount cameras and switches

See the **Camera Mounting Guide** at the back of this guide. 11 cameras total: 1 front (F) on the cab + 5 per wing (L1-L5, R1-R5; L1/R1 innermost). Count nozzles from the inner end of each wing — the guide tells you which nozzle group each bracket centers over. Wing cams clamp to the boom toolbar with the printed ring + worm-gear clamp, lens pointing straight down.

Two switches per wing: **inboard** between cams L2/L3 (R2/R3) and **outboard** between L4/L5 (R4/R5). Sheltered, glands down.

## Mount everything else

See the **Power Routing** drawing at the back of this guide. On the Sprayflex chassis:

- **Central Hub (FD-CH-V2)** on the rear boom rack, alongside the Capstan PinPoint III ECU.
- **Battery box** on the chassis within ~8 m of the Central Hub. Houses the 2x Daygreen H10-1224-48 converters and the 12V tap.
- **Cab cutoff switch (ALEV50-B)** in the cab, operator-accessible, inline on the battery feed before the converters.
- **Starlink Mini** on the cab roof, sky-visible, PD in the cab.

## Wire

Match the labels. Every cable is heat-shrink-labeled at both ends with **<SKU> <serial> <route>** (e.g. **FD-ETH-12.0M CBL-26-0007 CH->L-INB-SW**). Push to seat — you'll feel the wedgelock click. Run in split-loom, zip-tie every 12-18", leave ~6" of slack at each connector.

The wing-uplink cables crossing the fold hinge (ETH + power daisy from inboard to outboard switch on each wing) should curve, not pinch. **Fold each wing through its full range a few times before final zip-tying.**

The two CAN connectors are the one place a cable can go in the wrong spot — the rest are gender-keyed:

- **CAN port marked "1" = can1** — nozzle CAN to the **Capstan PinPoint III**.
- **Unlabeled CAN port = can0** — ISOBUS. Not nozzle control.

CAN termination: the Central Hub has terminators enabled internally on both CAN lines. Connecting the Hub adds an end terminator to that bus; disconnecting it takes one away. On the ISOBUS side that means pulling the terminator off the stub at the PinPoint III hub when you connect us — and putting it back if the Hub ever comes off.

## Power

Everything-on-48V, dual-converter split (full routing on the Power Routing drawing):

- 12V battery -> cab cutoff switch -> battery box -> 2x Daygreen H10-1224-48 (12V->48V)
- Converter A -> **boom bus** -> Central Hub Y -> L+R inboard switches, daisy to L+R outboard switches
- Converter B -> **system bus** -> Central Hub + Starlink PD in cab

All gender-keyed; no wrong way to plug it in.

## First boot

1. Visual check — every connector mated, no exposed conductors.
2. Tractor ignition on, then cab cutoff switch on — system powers up automatically.
3. Wait a minute — boot is automatic.
4. Join the **STARLINK** WiFi on your tablet and open <http://farmdefender.local:8080> to confirm cameras are online.

If anything looks wrong (no power lights, smoke, obvious damage), **stop** and call **(406) 271-6400** before driving. Operating instructions live in the digital user manual — link emailed at ship time.

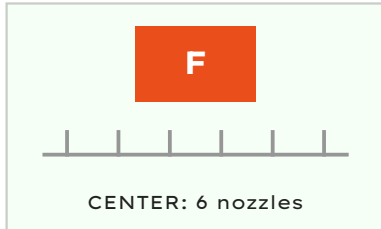
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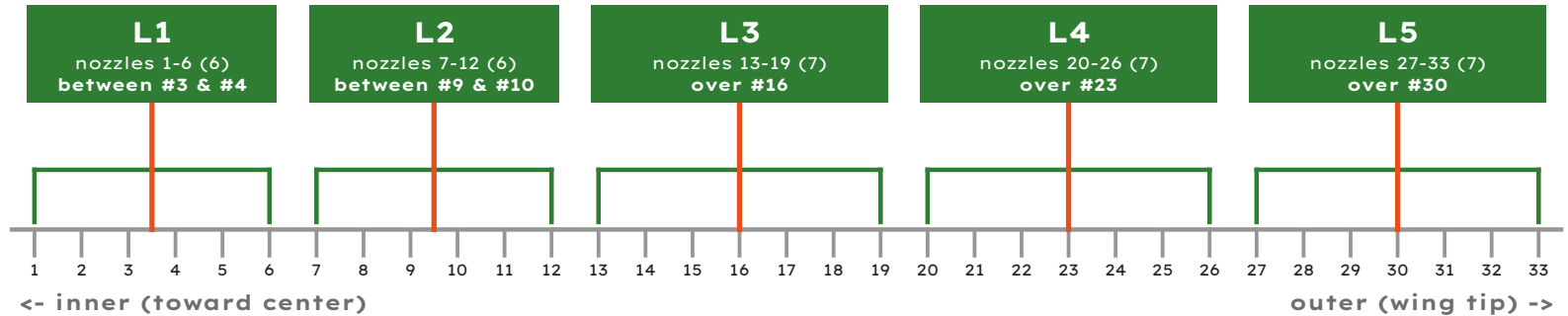
**Count nozzles from each wing's INNER end. Center each bracket over its group.**

72 nozzles: 6 center (front cam F) + 33 per wing, 20" apart. RIGHT wing mirrors the LEFT shown below.

**Front cam F -- on CL (cab/hood)**



**LEFT WING (right wing mirrors)**

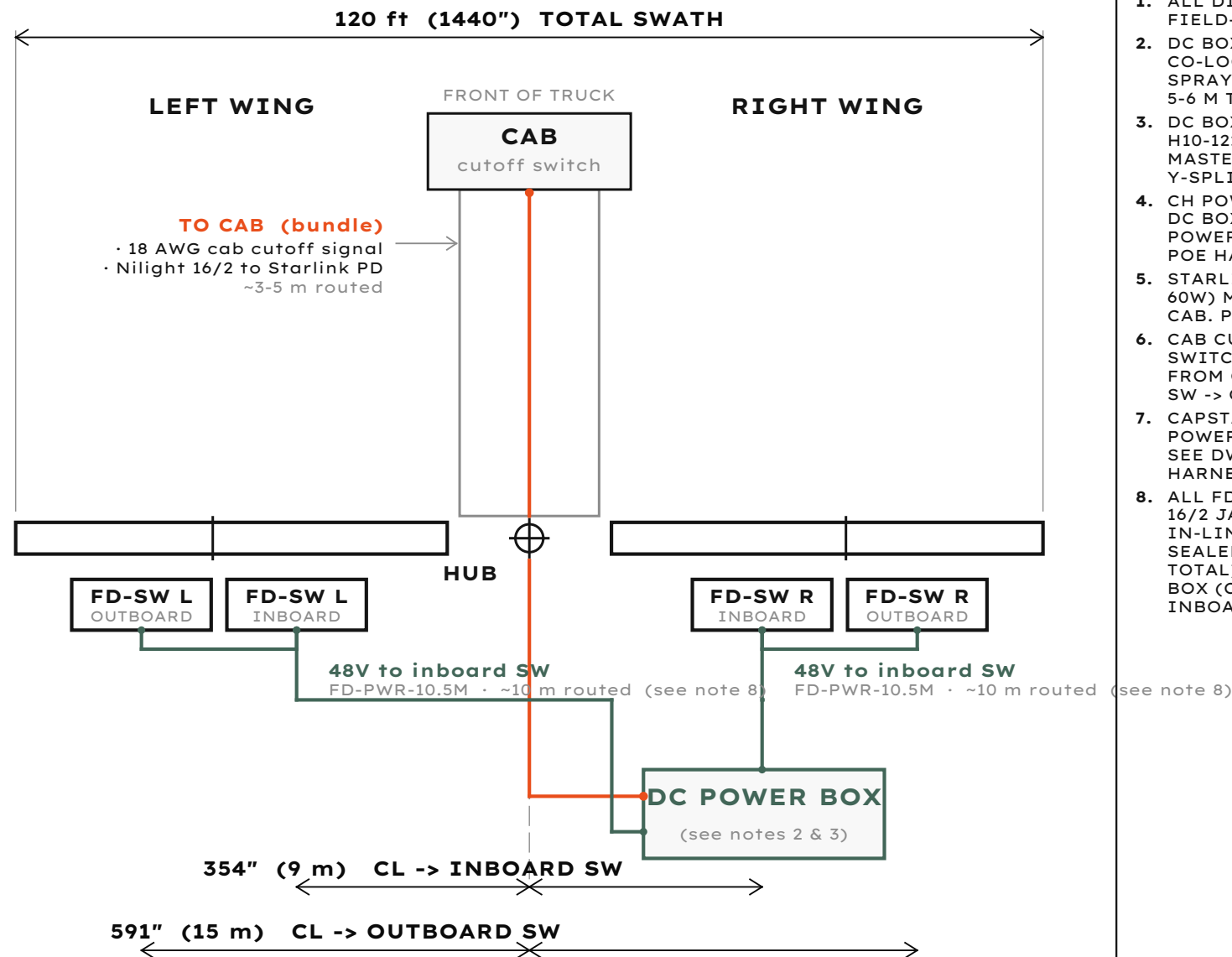


Green bar = nozzles each camera covers. Orange line = where to center the camera bracket.

**Coverage summary (per wing -- mirror for R side)**

| Camera    | Nozzles        | Count | Center bracket   |
|-----------|----------------|-------|------------------|
| F (front) | center section | 6     | on CL (cab/hood) |
| L1        | 1-6            | 6     | between #3 & #4  |
| L2        | 7-12           | 6     | between #9 & #10 |
| L3        | 13-19          | 7     | over #16         |
| L4        | 20-26          | 7     | over #23         |
| L5        | 27-33          | 7     | over #30         |

# PLAN VIEW — POWER ROUTING



## GENERAL NOTES

1. ALL DIMENSIONS NOMINAL; FIELD-VERIFY ROUTED RUNS.
2. DC BOX LOCATION VARIES PER SPRAYER. CO-LOCATE NEAR CENTRAL HUB. SPRAYFLEX EXAMPLE: BEHIND RH CAB, 5-6 M TO ECUS.
3. DC BOX CONTAINS: 2x DAYGREEN H10-1224-48, ALEV50-B CONTACTOR, 60A MASTER + 2x 30A + 5A COIL FUSES, 4x Y-SPLICE.
4. CH POWER = SHORT (~1 M) PIGTAIL FROM DC BOX SINCE CH MOUNTS ADJACENT. CH POWERS F1/F2 FRONT CAMS VIA ITS OWN POE HAT.
5. STARLINK PD ADAPTER (48V -> USB-C PD 60W) MOUNTS NEAR STARLINK MINI ON CAB. POWERED VIA THE "TO CAB" TRUNK.
6. CAB CUTOFF IS GROUND-SIDE SWITCHING: 18 AWG SINGLE CONDUCTOR FROM CONTACTOR COIL- UP TO ROCKER SW -> CHASSIS GROUND.
7. CAPSTAN PINPOINT III HAS ITS OWN POWER SUPPLY -- NOT ON FD 48V BUS. SEE DWG FT-CAP-2026-001 FOR CAPSTAN HARNESS.
8. ALL FD-PWR-\* CABLES: 16 AWG NILIGHT 16/2 JACKETED, NO END CONNECTORS. IN-LINE BUTT-SPLICE TO PRE-MADE SEALED Y ADAPTERS (DT 2-PIN, ~7.5" TOTAL) AT 4 POINTS PER KIT: 2 AT BAT BOX (CONV A + CONV B OUTPUTS) + 2 AT INBOARD SW (DAISY TO OUTBOARD).



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PROJECT

**FD-120 Power Routing**

FD-120-26-0001 / -0002 / -0003  
3 identical Sprayflex 120 machines

TITLE

**POWER ROUTING — INSTALL DRAWING**  
SPRAYER: SPRAYFLEX 120' MID-MOUNT

DWG NO.

**FT-PWR-2026-001**

DRAWN BY

**D. WEIST**

APPROVED BY

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REV

**A**

DATE

**2026-08-09**

SCALE / SHEET

**NTS 1 OF 1**

Cable kit (FD-CABLE-120FT) -- counts per kit | x3 = total for 3 kits

PRE-INSTALL SPEC -- confirm runs on boom (18" vert to cam + 12" SW pigtail) before cutting

| Cable        | /kit | x3 | Route                                                                                                                            |
|--------------|------|----|----------------------------------------------------------------------------------------------------------------------------------|
| FD-ETH-2.0M  | 8    | 24 | L2, L3, L4, L5 + R2-R5 to nearest SW (1.5 m runs each)                                                                           |
| FD-ETH-5.0M  | 2    | 6  | L1/R1 wing jumpers (4.5 m runs). v1.3: trimmed from 6 m.                                                                         |
| FD-ETH-7.0M  | 2    | 6  | Inboard -> outboard switch link on each wing. v1.3: bumped from 6 m.                                                             |
| FD-ETH-10.5M | 2    | 6  | Central -> L+R INBOARD camera hubs (boom feed). v1.4: dropped from 12 m (12 m had too much slack).                               |
| FD-ETH-12.0M | 1    | 3  | Central -> front cam F via cab tray. Bumped from 9 m (too short) then 10.5 m (barely) to 12 m.                                   |
| FD-PWR-1.0M  | 1    | 3  | Central -> Central Hub (co-located on rack)                                                                                      |
| FD-PWR-8.0M  | 2    | 6  | L+R inboard -> outboard SW daisy. v1.3: bumped from 6 m. v1.4: Starlink PD run removed from kit.                                 |
| FD-PWR-10.5M | 2    | 6  | Battery -> Central x2 (boom-bus + system-bus trunks); split AT central. Field-measured on kit 0001; trim future kits if shorter. |
| FD-PWR-12.0M | 2    | 6  | Central (boom-bus Y) -> L+R inboard SW, down the booms (parallels ETH boom feed). v1.3: bumped from 10.5 m.                      |
| TOTAL CABLE  | 22   | 66 |                                                                                                                                  |

Kit specs + design notes (per kit)

Weed Detectors

11 (x3 kits = 33)

Camera Hubs

2 (1 L + 1 R, x3 kits = 6)

Front-cam count

1

Cam FOV

3 m / 6 nozzles per cam

Camera Hub switch design

1x 5-port switch per FD-SW; inboard SW uses 1 uplink + 1 inter-switch link + 3 cam ports; outboard SW uses 1 inter-switch link + 4 cam ports

2 FD-SW per wing: inboard between L2/L3 (-9m), outboard between L4/L5 (-15m). Linked via 7m ETH + 8m PWR daisy (v1.3: PWR needs 1m more than ETH because ETH gets pigtail relief).

Power + coverage

48 V daisy-chain: Y-split -> inboard SW -> outboard SW. ~5 A per chain on 16 AWG; safe with margin.

72 nozzles covered by 11 cams: 6 cams cover 7 nozzles each + 5 cams cover 6 each (6x7 + 5x6 = 72). Front cam covers the 6 center-rear nozzles; per wing, 3 cams stretch to 7 and 2 stay at 6. Front mount reduced from 2 cams to 1 (mounting constraint up front); first-build trial on Weist sprayer.



Top-down boom view (36 m, 72 nozzles)

^ FRONT of machine (cab / hood)



1x Front cam mounted on cab/hood (forward of CH)

1x FD-ETH-12.0M (cab tray)

Central Hub  
FD-CH-V2  
+ GPS, ISOBUS, nozzle ctrl

Mounted at center of spray rack (mid-chassis)

CH -> inboard SW: 2x FD-ETH-10.5M + 2x FD-PWR-12.0M

inboard -> outboard SW: 2x FD-ETH-7.0M + 2x FD-PWR-8.0M

FD-SW  
L outboard  
@ -15.0 m

FD-SW  
L inboard  
@ -9.0 m

FD-SW  
R inboard  
@ +9.0 m

FD-SW  
R outboard  
@ +15.0 m

center section

L5

L4

L3

L2

L1

R1

R2

R3

R4

R5

-16.5 m

-13.5 m

-10.5 m

-7.5 m

-4.5 m

+4.5 m

+7.5 m

+10.5 m

+13.5 m

+16.5 m

-18 -12 -6 CL +6 +12 +18

[ Rear-hanging center section: 6 spray nozzles - sprayer wet system (Capstan PinPoint), not FD hardware ]

v REAR of machine (rear-hanging spray section)