[not to scale]

**LEFT SIDE**
Rows 1-15

**RIGHT SIDE**
Rows 16-30

# System Overview - 30 Outlet Monitoring System
## 2 Sections (15-15)

## Liquid Application Equipment Overview

16CH Product Node Harness

16CH Product Node Harness

Electronic Control Unit (ECU)

16CH Product Node

16CH Product Node

ECU Terminator

Quad-sensor cables
[not to scale]

Quad-sensor cables
[not to scale]

Sensor Cap
(For unused sensors)

FLOW To Outlet

FLOW From Pump

Manifold, 15 Outlets

30x Electronic Flowmeters (EFM)
One per outlet
patent pending

FLOW From Pump

Manifold, 15 Outlets
[Rear View]

FLOW To Outlet



Each EFM (30 total) has a sensor cable plugged into it. When powered, each EFM sends signal through the Product Node Harness, to Product Node, to ECU.

From ECU, wireless transmits to an Android tablet, and displays flow rate and other information to user.

## Electronic Flowmeters (EFM), Electronics & Harnesses Parts List

| Quantity | PART# | Description | Extra Information |
|---|---|---|---|
| 1 | 20603-00 | ECU Base Kit | incl. 20' battery harness, terminator, ECU, ECU antenna |
| 2 | 20621-00 | 16CH Node Kit | incl. 16CH Node, 16CH Node Harness, 4x Quad-sensor cable |
| 1 | | Sensor Cap | [Used for single sensor that will not be used] |
| as req'd | 20615-00 | Ext. Harness [NODE to SNR] | 6' Extension Harness [6-pin], NODE to QUAD-SENSOR CABLE |
| as req'd | 20616-00 | Ext. Harness [NODE to NODE] | 12' Extension Harness [8-pin], NODE Harness to NODE Harness |

## Manifold, Plumbing & Auxiliary Parts List

| Quantity | PART# | Description | Extra Information |
|---|---|---|---|
| 7 | 20634-00 | 4 Outlet EFM Manifold Kit | incl. 4-Outlet manifold, 4 EFM assembly kits (incl. jets), 4x Check Valve |
| 1 | 20633-00 | 3 Outlet EFM Manifold Kit | incl. 3-Outlet manifold, 3 EFM assembly kits (incl. jets), 3x Check Valve |
| 2 | 20576-00 | ORS Manifold Strainer | One strainer per Manifold Feed. |
| 4 | 20521-00 | ORS Manifold End-cap | Two used per center-fed manifold. |
| 2 | 20526-00 | ORS TEE w/ 1/4" NPT-F* | *1/4" NPT Port comes sealed; must be drilled out to be used. |
| 2 | 205XX-00 | ORS Inlet Fitting | ORS Inlet must be selected from catalog by preference (up to 1"). |
| 30 | 205XX-00 | ORS Outlet Fitting | ORS Outlet must be selected from catalog by preference. |
| 30 | 21500-VXX | ORS Metering Orifice | ORS metering orifice size must be selected by required flow rate. |

| Part No. 30 Outlet EFM Plumbing Manifold Assembly Overview | Rev. 1 |
|---|---|
| | Feb 5/20 |

Item Description  Flow Monitoring Manifold System, 30 Total Outlets
ORS Manifold Plumbing, 2 Section Layout (15-15)

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## Manual ON/OFF Check Valve
When 'ON', acts like check valve.
When 'OFF', turns off flow for maintenance/etc.

## Flowmeter Body patent pending
Sensor is inserted into [rear side] housing. Relays pulse feedback to product node.

## ORS Outlet/Inlet Fittings
A variety of sizes and types of fittings can be used from the O-ring Seal (ORS) outlet family. From Hose Barbs, to threads, to quick-connect tube.

## Flowmeter Jet patent pending
Stabilizes the flow across the flowmeter paddle wheel for more accurate and consistent readings
Color coded to flow range.
(Green/Red/Blue/Black)

## ORS Metering Orifice [Optional*]
If manifold is being used to meter liquid flow, use orifice. If metering orifice exists in system elsewhere, ignore ORS metering orifice.
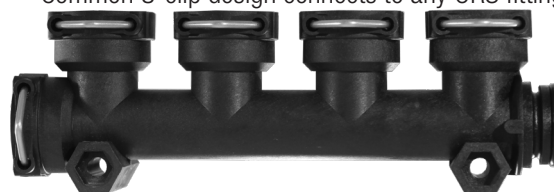
## [Optional] ORS Strainer [not to scale]
50 Mesh ORS Strainer Assembly
Housing + Strainer Cartridge
NEW

## ORS Tee [not to scale]
Center-feeds a plumbing manifold with an ORS Inlet

## ORS Manifolds [not to scale]
O-ring seal manifolds are available in 1-4 outlet varieties. Common U-clip design connects to any ORS fittings.

## ORS End-Cap [not to scale]
An end-cap is used to terminate any manifold end.

Manifold, 15 Outlets

FLOW

FLOW

[Back View]
No sensor cable

| Part No. | EFM Plumbing Manifold, 15 Outlet | Rev. 1 Feb 5/20 |
|---|---|---|

Item Description  Flow Monitoring Manifold System, 30 Total Outlets
ORS Manifold Plumbing, 2 Section Layout (15-15)

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# Manifold Breakdown, 15 Outlets

### Manual ON/OFF Check Valve
When 'ON', acts like check valve.
When 'OFF', turns off flow for maintenance/etc.

### Flowmeter Body[patent pending]
Sensor is inserted into [rear side] housing.
Relays pulse feedback to product node.

### ORS Outlet/Inlet Fittings
A variety of sizes and types of fittings can be used from the O-ring Seal (ORS) outlet family.
From Hose Barbs, to threads, to quick-connect tube.

### Flowmeter Jet[patent pending]
Stabilizes the flow across the flowmeter paddle wheel for more accurate and consistent readings
Color coded to flow range.
(Green/Red/Blue/Black)

### ORS Metering Orifice [Optional*]
If manifold is being used to meter liquid flow, use orifice. If metering orifice exists in system elsewhere, ignore ORS metering orifice.
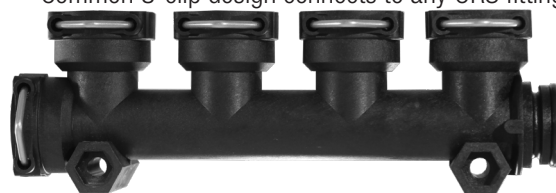
### ORS Manifolds [not to scale]
O-ring seal manifolds are available in 1-4 outlet varieties.
Common U-clip design connects to any ORS fittings.

### [Optional] ORS Strainer [not to scale]
50 Mesh ORS Strainer Assembly
NEW Housing + Strainer Cartridge

### ORS Tee [not to scale]
Center-feeds a plumbing manifold with an ORS Inlet

### ORS End-Cap [not to scale]
An end-cap is used to terminate any manifold end.

Manifold, 15 Outlets

FLOW

FLOW

[Back View]
No sensor cable

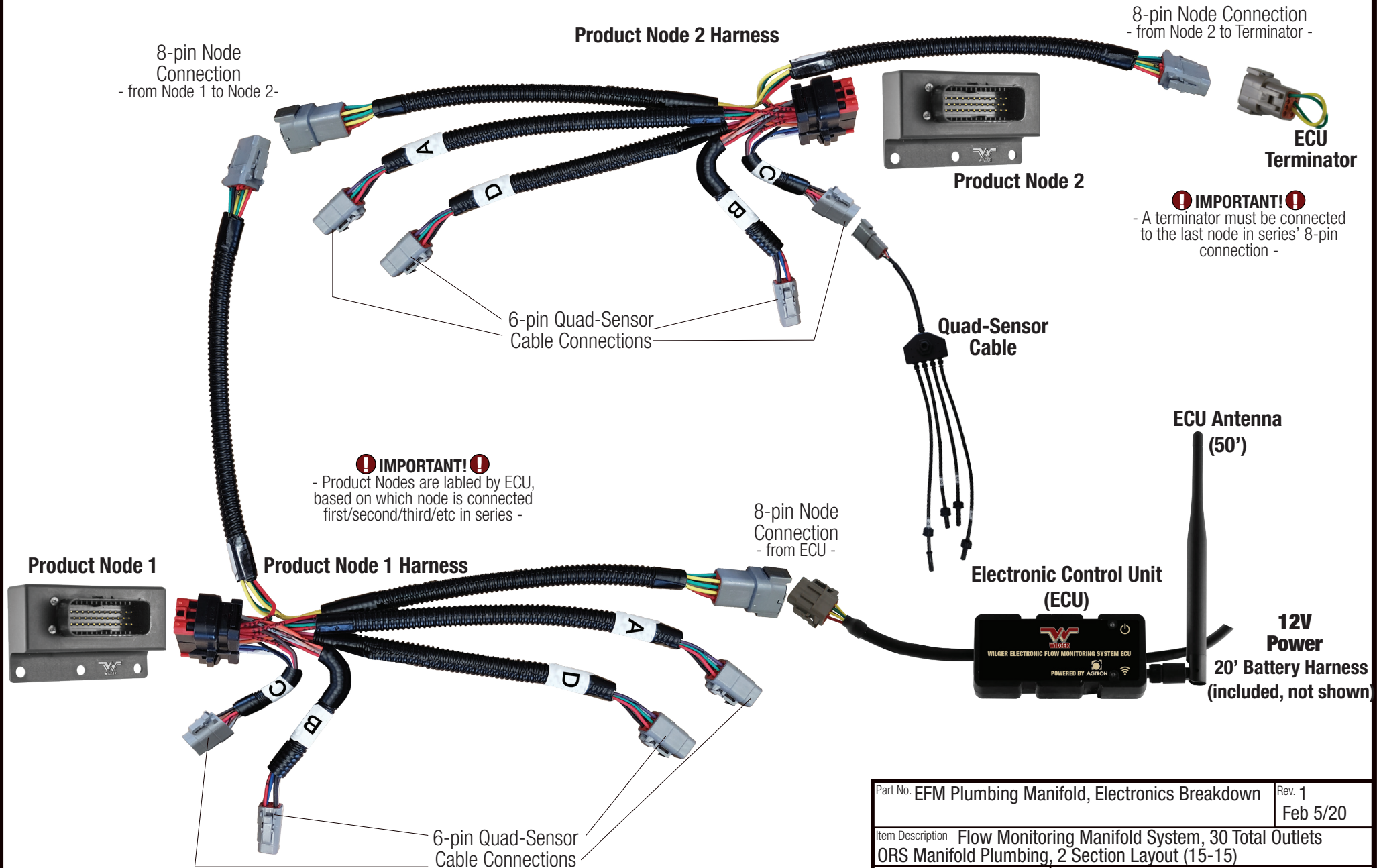| Part No. EFM Plumbing Manifold, 15 Outlet | Rev. 1 Feb 5/20 |
|---|---|

Item Description Flow Monitoring Manifold System, 30 Total Outlets
ORS Manifold Plumbing, 2 Section Layout (15-15)

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**8-pin Node Connection**
- from Node 2 to Terminator -

**8-pin Node Connection**
- from Node 1 to Node 2 -

**Product Node 2 Harness**

**ECU Terminator**

**Product Node 2**

⚠ **IMPORTANT!** ⚠
- A terminator must be connected to the last node in series' 8-pin connection -

6-pin Quad-Sensor Cable Connections

**Quad-Sensor Cable**

**ECU Antenna (50')**

⚠ **IMPORTANT!** ⚠
- Product Nodes are labled by ECU, based on which node is connected first/second/third/etc in series -

**8-pin Node Connection**
- from ECU -

**Product Node 1**

**Product Node 1 Harness**

**Electronic Control Unit (ECU)**

WILGER ELECTRONIC FLOW MONITORING SYSTEM ECU
POWERED BY AGTRON

**12V Power**
**20' Battery Harness (included, not shown)**

6-pin Quad-Sensor Cable Connections

| Part No. EFM Plumbing Manifold, Electronics Breakdown | Rev. 1 Feb 5/20 |
|---|---|

Item Description   Flow Monitoring Manifold System, 30 Total Outlets
ORS Manifold Plumbing, 2 Section Layout (15-15)

⚠ **Extension Harness are also available [not shown]**
**12' Node to Node Extension Harnesses [8-pin]**
**6' Node to Quad-Sensor Cable Extension Harnesses [6-pin]**

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**NOTE:** Since a 16 Channel (16CH) node can provide up to 16 sensors, on this 15 outlet manifold, a sensor cap would be used to cover the unused sensor.

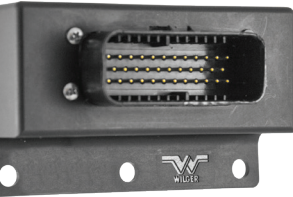# Sensor Connections Breakdown - 15 Outlet Manifold
## Node 1

**⚠ IMPORTANT! ⚠**
- Product Nodes are labled by ECU, based on which node is connected first/second/third/etc in series -

8-pin Node Connection
- to Node #2 -

**16CH Product Node Harness**

8-pin Node Connection
- from ECU-

**16CH Product Node**

A

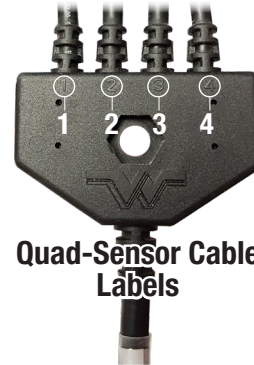C

B

D

## Quad-sensor Cable connected to 3 individual EFMs + 1 Sensor Cap

Each EFM connected to a sensor cable can now be added to the pumbing manifold.
Since the 1st sensor is not used, it is required to cap it off.

For our example, the sensor location NODE 1, DIV C, SNR 1 is capped off, so will not be used in the APP.

**⚠ IMPORTANT! ⚠**
- Quad-sensor cables have 4 sensors, with the molded label (1/2/3/4) designed by the marking on the base of the cable -

Label quad-sensor cables with Node cable letter

**Quad-Sensor Cable**

① ② ③ ④
1 2 3 4

**Quad-Sensor Cable Labels**

A

**PRO-TIP: Labeling Quad-Sensor Cables**

A

With a white marker, label each quad-sensor cable with A, B, C or D, based on which Product Node Harness cable it is connected to.

Each EFM has a sensor cable plugged into it. When powered, each EFM sends signal through the Product Node Harness, to Product Node, to ECU.

**[Rear View]**

From ECU, wireless transmits to an Android tablet, and displays flow rate and other information to user.
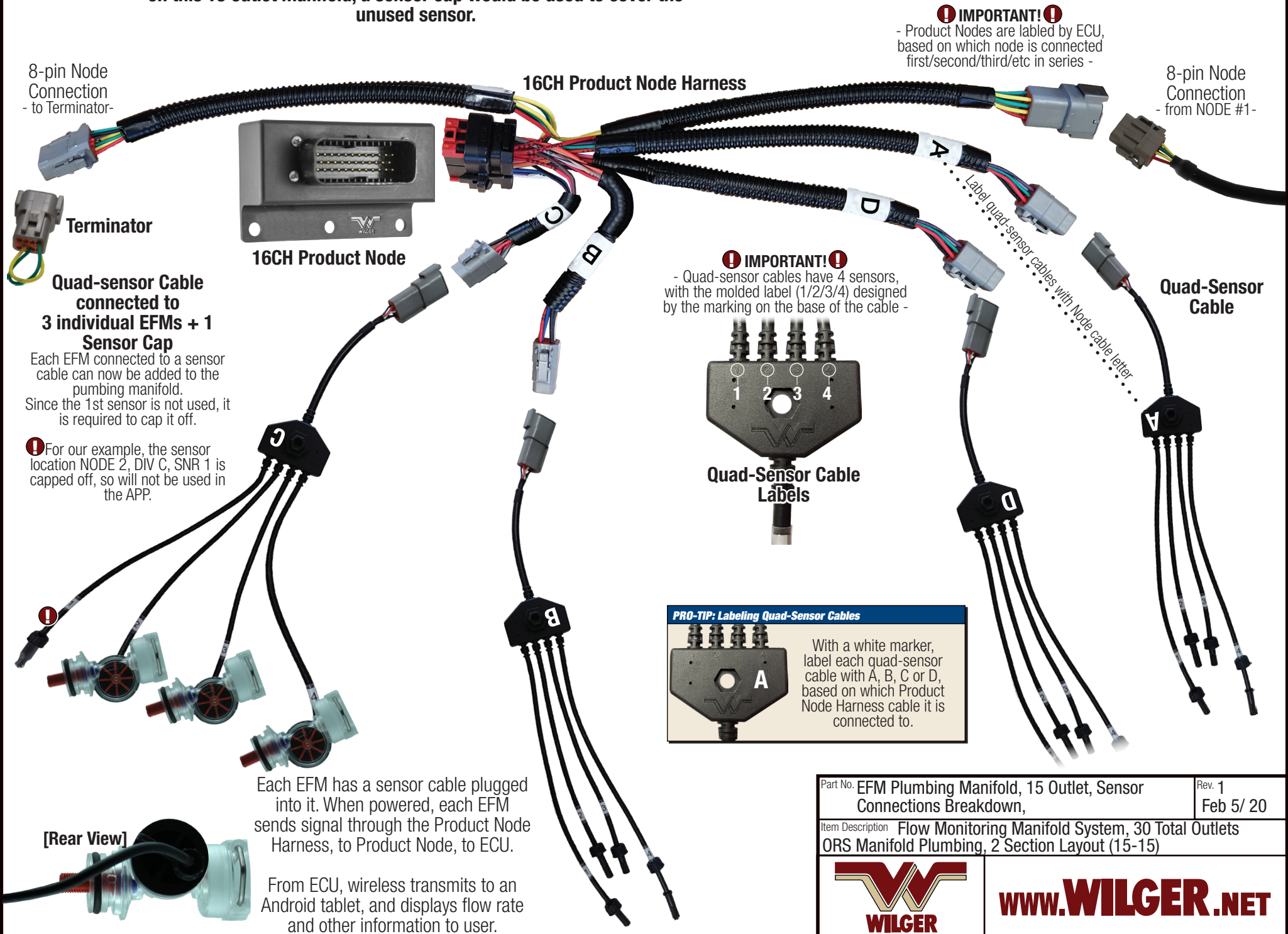
| Part No. EFM Plumbing Manifold, 16 Outlet, Sensor Connections Breakdown, | Rev. 1 |
| --- | --- |
| | Feb 5/20 |
| Item Description Flow Monitoring Manifold System, 30 Total Outlets ORS Manifold Plumbing, 2 Section Layout (15-15) | |

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**NOTE:** Since a 16 Channel (16CH) node can provide up to 16 sensors, on this 15 outlet manifold, a sensor cap would be used to cover the unused sensor.

# Sensor Connections Breakdown - 15 Outlet Manifold

⚠️ **IMPORTANT!** ⚠️
- Product Nodes are labled by ECU, based on which node is connected first/second/third/etc in series -

**8-pin Node Connection** - to Terminator-

**16CH Product Node Harness**

**8-pin Node Connection** - from NODE #1-

**Terminator**

**16CH Product Node**

Label quad-sensor cables with Node cable letter

**Quad-Sensor Cable**

**Quad-sensor Cable connected to 3 individual EFMs + 1 Sensor Cap**
Each EFM connected to a sensor cable can now be added to the pumbing manifold.
Since the 1st sensor is not used, it is required to cap it off.

⚠️ For our example, the sensor location NODE 2, DIV C, SNR 1 is capped off, so will not be used in the APP.

⚠️ **IMPORTANT!** ⚠️
- Quad-sensor cables have 4 sensors, with the molded label (1/2/3/4) designed by the marking on the base of the cable -

① ② ③ ④
**1  2  3  4**

**Quad-Sensor Cable Labels**

**PRO-TIP: Labeling Quad-Sensor Cables**
With a white marker, label each quad-sensor cable with A, B, C or D, based on which Product Node Harness cable it is connected to.

**[Rear View]**

Each EFM has a sensor cable plugged into it. When powered, each EFM sends signal through the Product Node Harness, to Product Node, to ECU.

From ECU, wireless transmits to an Android tablet, and displays flow rate and other information to user.

| Part No. EFM Plumbing Manifold, 15 Outlet, Sensor Connections Breakdown, | Rev. 1 |
|---|---|
| | Feb 5/ 20 |

Item Description  Flow Monitoring Manifold System, 30 Total Outlets
ORS Manifold Plumbing, 2 Section Layout (15-15)

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**NOTE: The following may look different depending on app version being used, but in essence, will be the same. Follow the manual for the most up-to-date reflection of the app.**

After completely setting up the ECU Settings Screen, enter the Sensor Setup Screen, which allows you to enter each respective product sensor in it's correct position, relative to the ECU.
While sensors do not have to be connected in consecutive order as laid out on your application implement, they do have to be entered accurately within the app to reference properly on the display.
The below example screen is only ONE depiction of how to set a screen up. For convenience, you can customize the layout of the outlets on up to 10 'section' pages.

**"Section 1": 15 Outlets**

We have to 'label' a sensor, based on its location. The label is derived from its:

**PRODUCT NODE#: NODE 1**
⚠️ **IMPORTANT!** ⚠️
- Product Nodes are labled by ECU, based on which node is connected first/second/third/etc in series -

**QUAD-SENSOR CABLE DIVIDER [DIV] LABEL: A / B / C / D**
⚠️ **IMPORTANT!** ⚠️
- Quad-sensor divider labels are labeled on the node harness itself, labeled with either an A, B, C, or D -

**SENSOR CABLE LABEL: 1 / 2 / 3 / 4**
⚠️ **IMPORTANT!** ⚠️
- Sensor cable labels are molded (or labeled) on the actual quad-sensor cable, with either a 1/2/3/4. Ensure you refer the sensor label correctly. -



**Electronic Flow Monitoring Sensor Setup**

Outlets: 1 2 3 4 5 6 7 8 9 10

Product: 1 2 3 — Liquid Nitrogen — Change

| Row | NODE | DIV | SNR | | Row | NODE | DIV | SNR | | NODE | DIV | SNR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | C | 2 | | 9 | 2 | D | 2 | | N/A | A | 1 |
| 2 | 2 | C | 3 | | 10 | 2 | D | 3 | | N/A | A | 1 |
| 3 | 2 | C | 4 | | 11 | 2 | D | 4 | | N/A | A | 1 |
| 4 | 2 | B | 1 | | 12 | 2 | A | 1 | | N/A | A | 1 |
| 5 | 2 | B | 2 | | 13 | 2 | A | 2 | | N/A | A | 1 |
| 6 | 2 | B | 3 | | 14 | 2 | A | 3 | | N/A | A | 1 |
| 7 | 2 | B | 4 | | 15 | 2 | A | 4 | | N/A | A | 1 |
| 8 | 2 | D | 1 | | | N/A | A | 1 | | N/A | A | 1 |

**How to Read the Sensor Location (Eg. Location 2A3)**
After entering your sensor locations into the app, as you'd like them laid out on pages 1-10, you can verify each line of the example as follows: **Outlet/Row 14** is connected to **SENSOR 3 or [SNR 3]** on the quad-sensor cable, on the **Node Harness Cable 'A' or [DIV A]**, which is connected to **Product Node 2 or [NODE 2]**.

**Physical Row Description**
This is manually added to depict which row this is on the implement.
For example, if a section begins at row '17', this cell can be entered as "17", etc. In this example, it began at **ROW 1**.

**[NODE] PRODUCT NODE #**
If the sensor is connected through the PRODUCT NODE #2 harness, ensure under NODE, it is listed as '2'.
Ensure a sensor's [NODE] corresponds with its correct NODE #. In this example, rows 1-15 began at **NODE 2**.

**[DIV] QUAD-SENSOR CABLE HARNESS LABEL**
Select A / B / C / D based on the corresponding node harness cable that a quad-sensor cable is attached to.
in our example, the first rows are attached to **DIV C**, as shown in the system overviews.

**[SNR] SENSOR CABLE LABEL**
Depending on the sensor cable's number (1/2/3/4) that is molded into the quad-sensor cable housing, enter the sensor number with the corresponding outlet.
Since our first sensor is capped, in our example, **SNR 2** is the first row of product on the implement.

| Part No. EFM Plumbing Manifold, 15 Outlet, Sensor Connections Breakdown | Rev. 1 Feb 5/20 |
|---|---|

Item Description Flow Monitoring Manifold System, 30 Total Outlets ORS Manifold Plumbing, 2 Section Layout (15-15)

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**NOTE: The following may look different depending on app version being used, but in essence, will be the same. Follow the manual for the most up-to-date reflection of the app.**

# How To Label Sensors For Entry Into APP - Outlets 16-30 [PRODUCT NODE 1]

After completely setting up the ECU Settings Screen 🖥️ , enter the Sensor Setup Screen 🔧 , which allows you to enter each respective product sensor in it's correct position, relative to the ECU.
While sensors do not have to be connected in consecutive order as laid out on your application implement, they do have to be entered accurately within the app to reference properly on the display.
The below example screen is only ONE depiction of how to set a screen up. For convenience, you can customize the layout of the outlets on up to 10 'section' pages.

**"Section 2": 15 Outlets**

We have to 'label' a sensor, based on its location. The label is derived from its:

**PRODUCT NODE#: NODE 1**
⚠️ **IMPORTANT!** ⚠️
- Product Nodes are labled by ECU, based on which node is connected first/second/third/etc in series -

**QUAD-SENSOR CABLE DIVIDER [DIV] LABEL: A / B / C / D**
⚠️ **IMPORTANT!** ⚠️
- Quad-sensor divider labels are labeled on the node harness itself, labeled with either an A, B, C, or D -

**SENSOR CABLE LABEL: 1 / 2 / 3 / 4**
⚠️ **IMPORTANT!** ⚠️
- Sensor cable labels are molded (or labeled) on the actual quad-sensor cable, with either a 1/2/3/4. Ensure you refer the sensor label correctly. -

## Electronic Flow Monitoring Sensor Setup

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|

**Product** | 1 | 2 | 3 | Liquid Nitrogen | Change

| | NODE | - | DIV | SNR | | NODE | - | DIV | SNR | | NODE | - | DIV | SNR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 1 | - | C | 2 | 24 | 1 | - | D | 1 | | N/A | - | A | 1 |
| 17 | 1 | - | C | 3 | 25 | 1 | - | D | 2 | | N/A | - | A | 1 |
| 18 | 1 | - | C | 4 | 26 | 1 | - | D | 3 | | N/A | - | A | 1 |
| 19 | 1 | - | B | 1 | 27 | 1 | - | D | 4 | | N/A | - | A | 1 |
| 20 | 1 | - | B | 2 | 28 | 1 | - | A | 1 | | N/A | - | A | 1 |
| 21 | 1 | - | B | 3 | 29 | 1 | - | A | 2 | | N/A | - | A | 1 |
| 22 | 1 | - | B | 4 | 30 | 1 | - | A | 3 | | N/A | - | A | 1 |
| 23 | 1 | - | D | 1 | | N/A | - | A | 1 | | N/A | - | A | 1 |

**How to Read the Sensor Location (Eg. Location 1A2)**
After entering your sensor locations as you'd like your rows laid out, you can read & verify each line of the example as follows:
**Outlet 29** is connected to **SENSOR 2 or [SNR 2]** on the quad-sensor cable, on the **Node Harness Cable 'A' or [DIV A]**, which is connected to **Product Node 1 or [NODE 1]**.

**Physical Row Description**
This is manually added to depict which row this is on the implement.

For example, if a section begins at row '16', this cell can be entered as "16", etc. In this example, it began at **ROW 16**.

**[NODE] PRODUCT NODE #**
If the sensor is connected to the 16CH PRODUCT NODE #1 harness, ensure under NODE, it is listed as '1'.

Ensure a sensor's [NODE] corresponds with its correct NODE #.
In this example, rows 16-30 began at **NODE 1**.

**[DIV] QUAD-SENSOR CABLE HARNESS LABEL**
Select A / B / C / D based on the corresponding node harness cable that a quad-sensor cable is attached to.

in our example, the first rows are attached to **DIV C**, as shown in the system overviews.

**[SNR] SENSOR CABLE LABEL**
Depending on the sensor cable's number (1/2/3/4) that is molded into the quad-sensor cable housing, enter the sensor number with the corresponding outlet.

Since our first sensor is capped, in our example, **SNR 2** is the first row of product on the implement.

| Part No. EFM Plumbing Manifold, 15 Outlet, Sensor Connections Breakdown | Rev. 1 Feb 5/20 |
|---|---|

Item Description  Flow Monitoring Manifold System, 30 Total Outlets
ORS Manifold Plumbing, 2 Section Layout (15-15)

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